

**U.S. Department of the Interior
Bureau of Land Management**

**ENVIRONMENTAL ASSESSMENT
DOI-BLM-MT-C030-2016-0020-EA**

December 19, 2016

**The Falkirk Mining Company Federal Coal Lease by Application
Serial Number: NDM 107039**

Location: Fifth Principle Meridian, North Dakota
Township 146 North, Range 82 West
Section 10, East½
320 acres
McLean County

Applicant/Address: The Falkirk Mining Company
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In cooperation with:
The Office of Surface Mining Reclamation and Enforcement
Denver, Colorado
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North Dakota Public Service Commission
Bismarck, North Dakota

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CHAPTER 1 PURPOSE AND NEED

1.1 Introduction

On November 13, 2013, the Falkirk Mining Company (Falkirk Mine) submitted an application to lease the Federal coal resources located in the east ½ of section 10, Township 146 North, Range 82 West. The Falkirk Mine is located in southern McLean County, North Dakota, south of Lake Sakakawea and east of the Missouri River. Please refer to **Figure 1, Falkirk Mine Overview**.

The east ½ of section 10 (section 10 lease tract) consists of approximately 320 acres of land. Surface ownership of the section 10 lease tract is entirely private. Mineral rights are 50 percent owned by the Federal Government and 50 percent owned by private parties. The Federal mineral estate in the section 10 lease tract is administered by the Bureau of Land Management (BLM) North Dakota Field Office (NDFO). The Falkirk Mine estimates that the section 10 lease tract contains approximately 3.39 million tons of in-place mineable federally and privately owned coal.

This Environmental Assessment (EA) assists the BLM in project planning to ensure compliance with the National Environmental Policy Act (NEPA) (42 United States Code [U.S.C.] §§ 4321–4370h). In addition, this EA is an informational document used by both decision-makers and the public that discloses potential environmental and socioeconomic impacts of the Proposed Action and alternatives.

1.2 Background

The Falkirk Mine is a surface lignite mining operation located near Underwood, North Dakota. It was first incorporated in 1974 with initial earthwork starting in 1975 and coal production starting in 1983. Currently, the Falkirk Mine employs 412 full-time employees and 118 temporary employees and produces approximately 8.0 - 8.5 million tons of lignite coal per year.

The Falkirk Mine has leased approximately 360 acres of Federal coal since production started in 1983. The Falkirk Mine has three Federal coal leases (i.e., NDM91647, NDM85516, and M190310530); however, as of 2005, they are not currently active. From 1983 to 2005, a total of approximately 4.5 million tons of lignite coal was produced from these leases. The Falkirk Mine contains less than two percent mineable Federal coal within their current mining permits.

The Falkirk Mine is a subsidiary of the North American Coal Corporation (NACC) headquartered in Dallas, Texas. NACC has a long history in North Dakota, dating back to 1957 when they purchased the Indian Head Mine located near Zap, North Dakota. Coal mining at Indian Head Mine has since ceased and the mine has been completely reclaimed. In addition to the Falkirk Mine, NACC currently operates the Freedom Mine located north of Beulah, North Dakota, and will be starting production in the spring of 2016 at the recently constructed Coyote Creek Mine located south of Beulah, North Dakota. NACC also operates surface lignite coal mines in Texas, Mississippi, and Louisiana, as well as several limestone quarries in Florida.



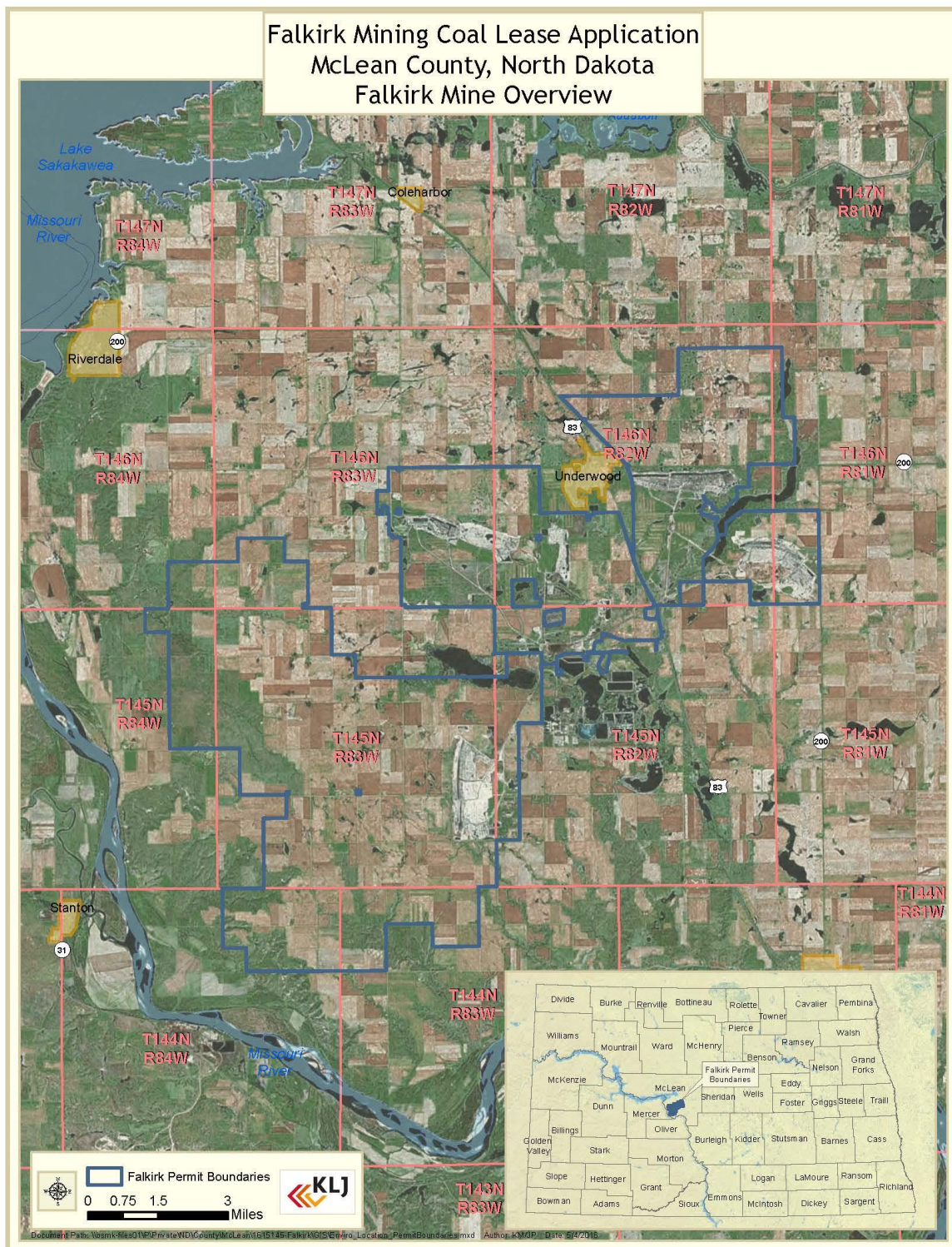


Figure 1, Falkirk Mine Overview



The lignite coal produced at the Falkirk Mine is usually transported by a 20,400-foot-long conveyor to Great River Energy's Coal Creek Station located 6 miles south of Underwood, North Dakota. However, currently, the conveyor is out of service, but still in place. The Falkirk Mine continues to evaluate the need for refurbishing the conveyor for new use, which is contingent upon the cost and availability of diesel fuel and haulage trucks. As of January 2014, a specific design for the truck dump and loading facility for the cable belt rebuild are being investigated and reviewed. The current transport of coal produced at the Falkirk Mine is via haulage trucks. Coal Creek Station has 235 employees and generates 1,200 megawatts (MW) (2 – 600 Megawatt Units) of power, which is transmitted to 28 member cooperatives that cover roughly two-thirds of rural Minnesota.

Great River Energy also operates the Spiritwood Station located east of Jamestown, North Dakota, approximately 1-mile south of Spiritwood, North Dakota. This combined heat and power plant utilizes dried and refined lignite from the Coal Creek Station to produce up to 99 MW of electricity for regional energy markets and supplies local industry with steam for their production processes. Forty-three individuals are employed at the Spiritwood Station.

The section 10 lease tract is part of the Falkirk Mine's current and extended Mine Plan with the south ½ of the section 10 lease tract already permitted through the North Dakota Public Service Commission (PSC). Leasing and mining the coal contained within the section 10 lease tract would contribute approximately four months-worth of production at the Falkirk Mine.

1.3 Purpose and Need

The purpose of the Proposed Action is for the BLM to respond to the Falkirk Mine's Lease by Application to lease the Federal coal resources in the section 10 lease tract. The BLM will determine whether to lease the Federal coal resources located within the current and extended Falkirk Mine Plan.

The Proposed Action is needed to comply with the Mineral Leasing Act of 1920 and Federal Land Policy and Management Act of 1976. It is the BLM's responsibility to evaluate the potential environmental effects of issuing a Federal coal lease. The BLM is obligated to continue the economically viable development of Federal coal on lands open for development. The need is also being driven by the continued power demand of end users and the requirements of energy companies to meet those demands with a diversified power supply from multiple resources.

1.4 Conformance with BLM Land Use Plan(s)

The Federal Coal Leasing Amendments Act of 1976 requires that lands considered for leasing are managed by a comprehensive land use plan. The NDFO Resource Management Plan/Environmental Impact Statement (RMP/EIS) (approved April 22, 1988, and amended September 21, 2015) identifies tracts of Federal coal available for further consideration for leasing through the application of the following four land use planning screens: (a) identification of coal development potential, (b) application of unsuitability criteria, (c) analysis of multiple-use conflicts, and (d) application of surface-owner consultation. If the Federal coal lands pass the above mentioned land use planning screens, they are then considered for leasing.

Under the first land use planning screen, a lease tract must be located within an area known to have coal development potential. The section 10 lease tract was included in the Underwood Coal Study Area



of the RMP/EIS which was within the area identified as having coal development potential by the BLM in the screening analysis. In addition, the local area has been mined for coal production for more than 80 years and the required infrastructure is in-place to enable the development of the resource.

For lands that have been identified as having coal development potential, the BLM reviews whether these lands are suitable for coal development based on 20 criteria. Criterion 14 states, “Federal lands that are high priority habitat for migratory bird species of high Federal interest on a regional or national basis, as determined jointly by the surface management agency and USFWS, shall be considered unsuitable.” The unsuitability determination for the section 10 lease tract, in conjunction with the U.S. Fish and Wildlife Service (USFWS), found high priority habitat and appropriate buffer zones for ferruginous hawks and canvasbacks, totaling 657 acres. The Falkirk Mine has committed to, and developed a Fish and Wildlife Management Plan to protect, enhance or reclaim wildlife habitat in the current (and future) North Dakota state mining permit approved by the North Dakota PSC. Please refer to **Section 4.3 General Wildlife** for additional information.

The third land use planning screen is the analysis of multiple-use conflicts. In accordance with 43 Code of Federal Regulations (CFR) 3420.1-4(e)(3), the analysis must be completed to identify and “eliminate additional coal deposits from further consideration for leasing to protect resource values of a locally important or unique nature, not included in the unsuitability criteria.” The section 10 lease tract is currently being utilized for agriculture production and would be required to trade-off farming for mining. The trade-off period would be for the amount of time required to mine the section 10 lease tract, and then, it would be reclaimed to reinstate agricultural production. Please refer to **Section 4.7 Prime and Unique Farmlands** for additional information.

The Falkirk Mine currently holds a lease with the surface owner for the section 10 lease tract. The Falkirk Mine has taken several steps to consider mining effects on local residents and property, including but not limited to, providing written notice to all surface owners within a proposed permit area, requesting surface owner input through a landowner preference statement, publishing a legal notice describing submittal of a permit application and opportunity to comment in various local newspapers, and making copies of permit applications available for public review. The Falkirk Mine also maintains surface owner relations throughout the mining and reclamation process.

1.5 Relationship to Statutes, Regulations, or Other Plans

The proposed lease and mining activities in this EA would be processed in accordance with the regulations found at 43 CFR 3425 for Lease by Application, and evaluated under the following Federal authorities:

- ◆ Mineral Leasing Act (MLA) of 1920, as amended
- ◆ National Environmental Policy Act (NEPA) of 1969
- ◆ Federal Land Policy Management Act of 1976
- ◆ Federal Coal Leasing Amendments Act of 1976
- ◆ Surface Mining Control and Reclamation Act (SMCRA) of 1977, as amended
- ◆ Energy Policy Act (EPA) of 2005.



The BLM is the lead agency responsible for leasing Federal coal lands under the MLA, as amended by FCLAA, and is responsible for preparation of this EA to evaluate the potential environmental impacts of issuing a coal lease.

The Office of Surface Mining Reclamation and Enforcement (OSMRE) is a cooperating agency on this EA. The SMCRA provides the OSMRE primary responsibility for administering programs that regulate surface coal mining operations in the United States. Pursuant to Section 503 of SMCRA, the North Dakota PSC developed, and the Secretary of the Interior approved, North Dakota's permanent regulatory program authorizing the PSC to regulate surface coal mining operations on private and state lands within North Dakota. Pursuant to Section 523 of SMCRA, the North Dakota PSC entered into a cooperative agreement with the Secretary of the Interior authorizing the PSC to regulate surface coal mining operations on Federal lands within the state (30 CFR Part 934).

Pursuant with this cooperative agreement, a Federal coal lease holder must submit a permit application package, which includes the Resource Recovery and Protection Plan and State Mining Permit application to OSMRE and the North Dakota PSC for any proposed coal mining and reclamation operations on Federal lands located in the state. Federal lands include surface ownership and mineral interests, owned by the Federal Government. If the permit application complies, the North Dakota PSC issues a permit to the applicant to conduct coal mining operations. The North Dakota PSC has issued one permit associated with the Proposed Action (Permit No. NAFK-8405). The permit covers mining activities in the south ½ of section 10; however, no actual mining of the unleased Federal coal tract is proposed in the permit application. Therefore, the Falkirk Mine is currently in the process of compiling information for a North Dakota PSC permit application that would include mining activities in the north ½ of section 10. The permit application is anticipated to be submitted to the North Dakota PSC in 2017. Please refer to **Figure 2, Section 10 Lease Tract**.

After the permit has been approved, but prior to the mining of Federal coal, pursuant to 30 CFR 746, OSMRE shall prepare and submit to the Secretary of the Interior a decision document recommending approval, disapproval, or conditional approval of the proposed mining plan. The recommendation shall be based, at a minimum, on the following:

1. The permit application, including the Resource Recovery and Protection Plan (R2P2)
2. Information prepared in compliance with NEPA, including this EA
3. Documentation assuring compliance with the applicable requirements of Federal laws, regulations, and Executive Orders (EOs) other than NEPA
4. Comments and recommendations or concurrence of other Federal agencies and the public
5. Findings and recommendations from the BLM with respect to the R2P2, Federal lease requirements, and the MLA
6. Findings and recommendations from the North Dakota PSC with respect to the permit application and the Abandoned Mine Lands Program
7. Findings and recommendations from the OSMRE with respect to the additional requirements of 30 CFR Chapter VII, Subchapter D.



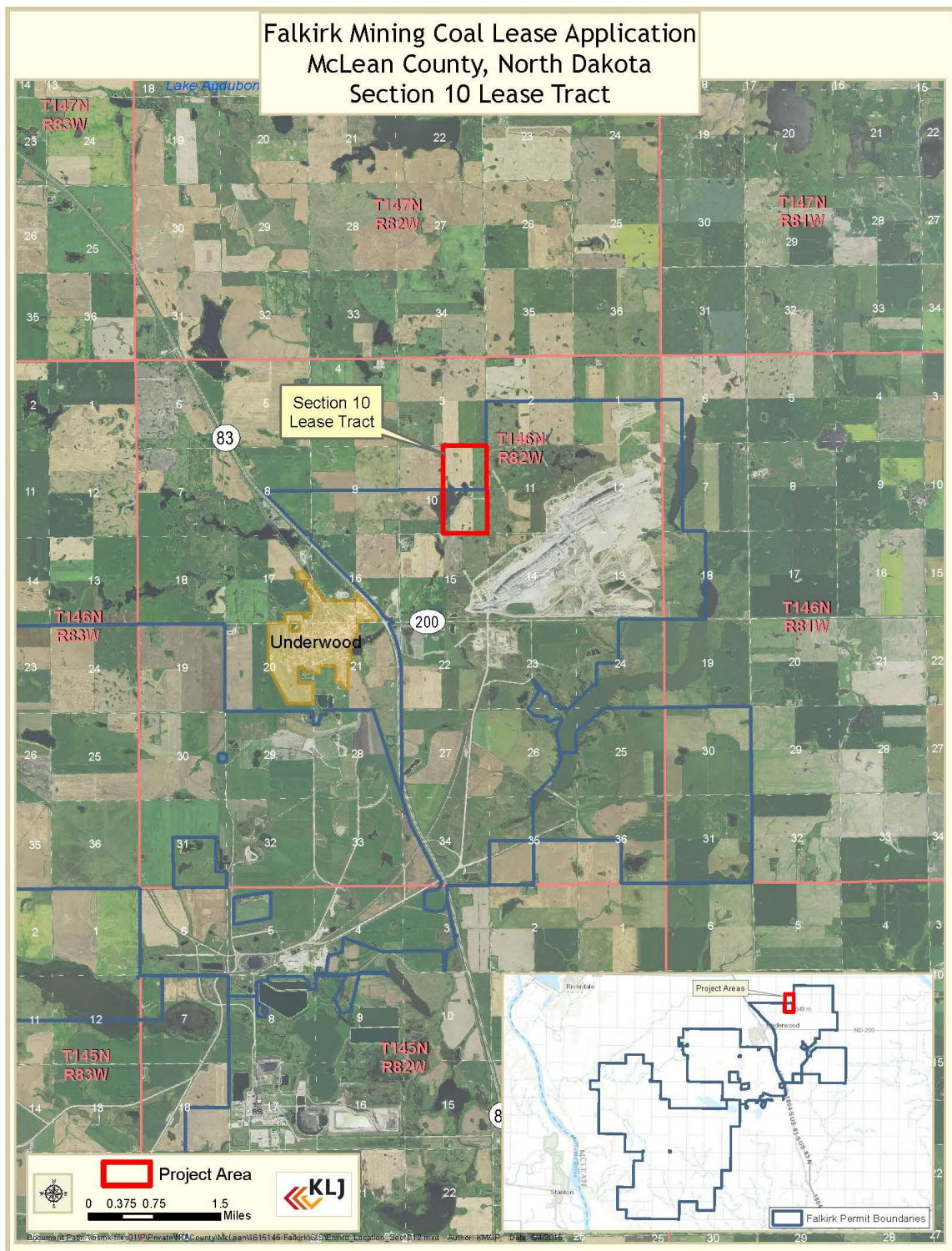


Figure 2, Section 10 Lease Tract



In accordance with the MLA, the Assistant Secretary for Land and Minerals Management (ASLM) must approve the mining plan before any mining and reclamation can occur on lands containing leased Federal coal. Following review of the OSMRE's recommendation and supporting documentation, the ASLM will issue a decision approving the mining plan, approving the mining plan with conditions, or denying the mining plan.

In addition to the acts listed above, guidance and regulations for managing and administering public lands are set forth in 40 CFR 1500 (Protection of the Environment) and 43 CFR 3400 (Coal Management).

1.6 Scoping, Public Involvement, and Issues

Identification of issues specific to the Proposed Action and Alternatives occurred at an initial project kickoff meeting held at the Falkirk Mine office located near Underwood, North Dakota, on March 23, 2015. Agencies that attended the meeting included BLM, OSMRE, North Dakota PSC; and representatives from the Falkirk Mine, NACC, and KLJ (consultant). Areas of concern regarding the proposed project and clearance and approvals that had been received during preparation of the existing mine permit (Permit No. NAFK-8405) were discussed at the meeting. Areas of concern included: threatened and endangered species, greenhouse gas emissions, climate change and air quality, water resources, reclamation, wildlife, cultural resources and economic resources.

Immediately following the project kickoff meeting, a 15-day public review period was held to allow interested parties an opportunity to comment on the proposed project. No comments were received. Internal scoping followed, whereby the BLM and cooperating agencies more clearly defined potential issues of and data requirements, for the Proposed Action and Alternatives. Initial internal scoping and coordination has ended with the necessary agencies, and comments are addressed in this EA, where appropriate.



The BLM has the authority to lease Federal coal, but does not authorize the mining of that resource. The OSMRE, has the authority to approve a Federal mine plan application and the North Dakota PSC has the authority to authorize surface mining. Although the Proposed Action only involves the leasing of a Federal coal resource, the mining of the coal (a connected action) will also be discussed and analyzed in this document. OSMRE and North Dakota PSC intend to use this EA to facilitate the completion of their respective mine permitting actions following the BLM coal leasing decision.

2.1 Proposed Action—The Leasing of Federal Coal in Section 10

On November 13, 2013, the Falkirk Mine filed an application to lease 320 acres of Federal coal located in the east ½ of section 10, Township 146 North, Range 82 West in McLean County, North Dakota, under the Lease by Application regulations (43 CFR 3425.1). The surface of the section 10 lease tract is privately owned (i.e., split estate), and the Federal Government owns an undivided 50 percent interest in the mineral rights. The Proposed Action is the leasing of the Federal coal in the section 10 lease tract.

Subsurface mineral rights in the section 10 lease tract are 50 percent owned by the Federal Government and 50 percent owned by private parties. According to the Falkirk Mine, the combined Federal and private mineral ownership within the east ½ of section 10 lease tract consists of approximately 3.39 million tons of in-place mineable lignite coal.

Under the existing Falkirk Mine Plan, mining of the section 10 lease tract would commence in 2018. The existing mining facilities have been established to sustain the current mine plan, which includes the mining of section 10. Please refer to **Appendix A, Falkirk Mine Plan**. Implementation of the Proposed Action would comply with currently approved stipulations, mitigation measures, and monitoring programs, as described in existing mine permits and summarized in the following sections of this EA. Additionally, the leasing of the proposed tract would be subject to BLM special coal lease stipulations and the standard stipulations found on the Federal coal lease form.

Please refer to **Section 2.4 Coal Mining Operations** for a description of the mining of Federal coal (connected action).

2.2 Alternative I—No Action Alternative

Under the No Action Alternative (Alternative I), the section 10 lease tract would not be leased. The current permitted and approved mining operations would proceed as planned until the section 10 lease tract is reached, then mining operations would bypass the lease tract. Federal revenue generated from the lease bonus payment and production royalty payments would not be received. Since 50 percent of this revenue is shared with the State of North Dakota, this revenue stream would not be received by North Dakota. In addition, state tax revenue derived from coal production would not be received. Under the No Action Alternative, the private owners of mineral estate in the section 10 lease tract would not be able to develop their mineral rights and would not receive bonus or royalty payments from leasing their coal interest.

If the section 10 tract is not leased, the coal located immediately adjacent to the lease tract would continue to be mined and reclaimed, as planned in the Falkirk Mine Plan. The south $\frac{1}{2}$ of the section 10 lease tract is already permitted and leased for surface disturbance; therefore, a significant amount of surface disturbance would still occur within the southeast $\frac{1}{4}$ of the section 10 lease tract (approximately 160 acres). This includes removal of topsoil and subsoil and using the land for other ancillary mining purposes such as stockpile (i.e. topsoil, subsoil, and overburden) locations.

Under the No Action Alternative, the Falkirk Mine would continue to produce approximately 8.0-8.5 million tons of lignite annually and modify their mine plan to bypass the section 10 lease tract.

2.3 Alternatives Considered but Eliminated from Detailed Analysis

Under NEPA, consideration and analysis of reasonable alternatives to the Proposed Action are required in an EA. Considering alternatives helps to avoid unnecessary impacts and allows for an analysis of reasonable ways to achieve the stated purpose. To warrant detailed evaluation, a proposed alternative must be reasonable. To be considered reasonable, an alternative must be suitable for decision-making (i.e., any necessary preceding events have taken place), capable of implementation, and satisfactory with respect to meeting the purpose of and need for the action.

The following factors were considered when evaluating alternatives to the Proposed Action:

- ◆ Conformance with the existing land use plan, in accordance with the Federal Coal Leasing Amendments Act
- ◆ Evaluation under the land use planning screens described in Section 1.4 of this EA
- ◆ Application of unsuitability criteria – For lands that have been identified as having coal development potential, the BLM reviews whether these lands are suitable for coal development based on 20 criteria.

Based on these factors, the following alternative was considered, but eliminated from further detailed analysis.

2.3.1 The Leasing of Federal Coal in Section 10 and Section 12

The Leasing of Federal Coal in Section 10 and Section 12 Alternative incorporates (1) the leasing of the federally and privately owned coal in the east $\frac{1}{2}$ of section 10, Township 146 North, Range 82 West, as described in Section 2.1 of this EA, as well as, (2) the leasing of the federally and privately owned coal in a lease tract consisting of approximately 121 acres of Falkirk Mine-owned surface, located in the S $\frac{1}{2}$ NE $\frac{1}{4}$ and NE $\frac{1}{4}$ NE $\frac{1}{4}$ section 12, Township 145 North, Range 84 West. The coal resources in the section 12 lease tract are 50 percent owned by the Federal Government and 50 percent owned by private parties. The Falkirk Mine estimates the 121-acre lease tract contains approximately 2.09 million tons of in-place mineable lignite coal. Please refer to **Figure 3, Section 10 and Section 12 Lease Tracts**.

Implementation of this alternative would enable the Falkirk Mine to mine approximately 5.48 million tons of coal occurring in approximately 441 acres of land in the section 10 and section 12 lease tracts. Under the existing Falkirk Mine Plan, the lease tract located in section 12 would be reached in 2025.



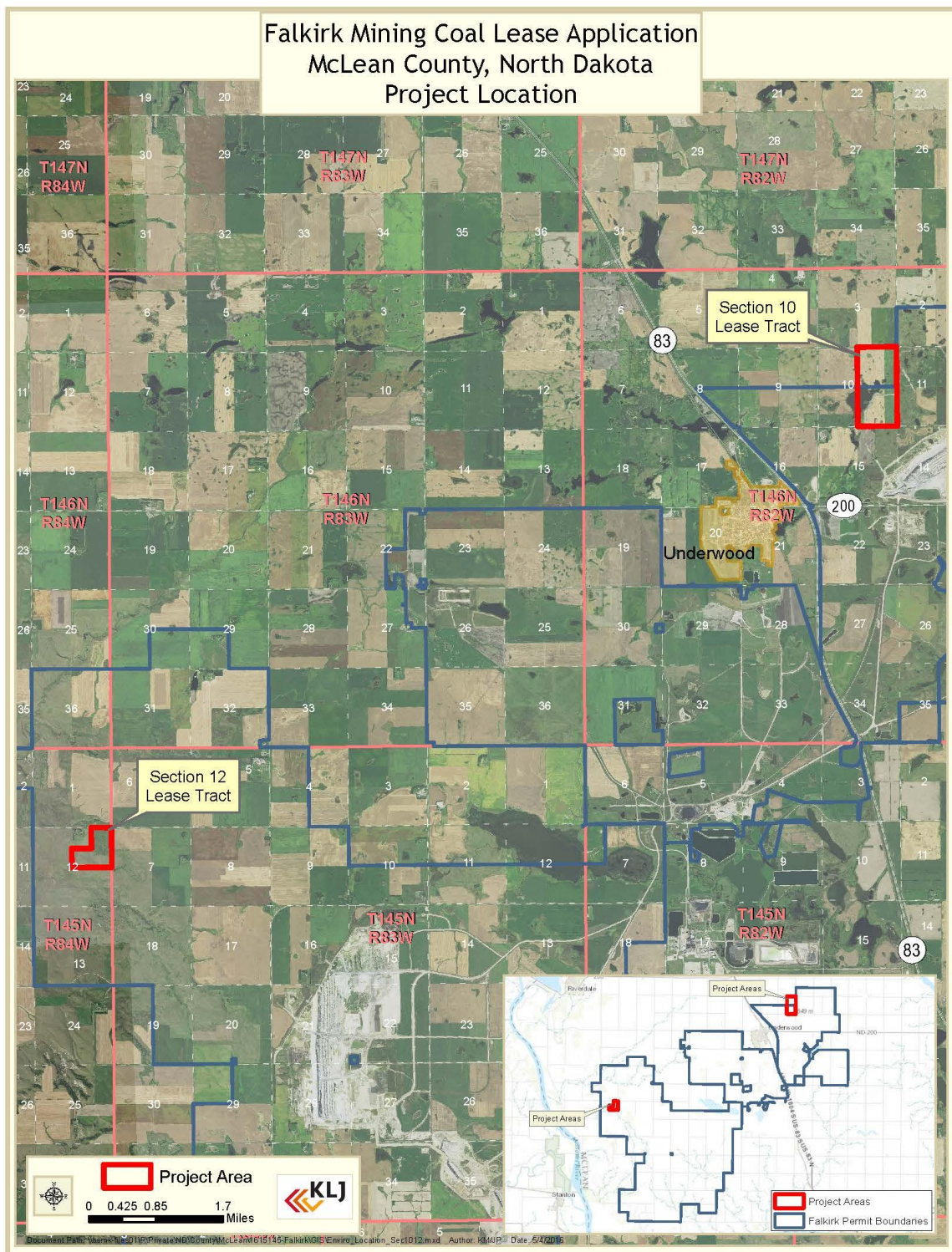


Figure 3, Section 10 and Section 12 Lease Tracts



As described in Section 1.4 of this EA, the Federal Coal Leasing Amendments Act requires that lands considered for leasing are managed by a comprehensive land use plan. In addition, the NDFO RMP/EIS identified tracts of Federal coal available for further consideration for leasing through the application of land use planning screens. For lands that have been identified as having coal development potential, the BLM reviews whether these lands are suitable for coal development based on 20 criteria. The section 12 lease tract is not included in the current land use plan. In addition, the section 12 lease tract occurs just outside of the 1988 Coal Study Area included in the NDFO RMP/EIS. Therefore, the section 12 lease tract has not been evaluated under the land use planning screens or assessed for suitability based on the 20 criteria. Because the section 12 lease tract is not included in the current land use plan, has not been evaluated under the land use planning screens, and the unsuitability criteria have not been applied to the section 12 lease tract, this alternative is not considered a viable action alternative at this time and was eliminated from further detailed analysis in this EA.

2.4 Coal Mining Operations

2.4.1 Regulations and Permitting

As stated in Section 1.5 of this EA, all surface mining operations in North Dakota are regulated by the North Dakota PSC. The PSC provides permits for, and conducts inspections of, coal mining operations throughout the State of North Dakota. Prior to disturbing lands for mining, the mine is required to apply for, and receive, a state mining permit from the PSC. The mining permit application provides detailed information regarding the proposed mining operations and environmental protection plans. Once the permit is approved by the PSC, the mining operations and environmental protection plans included in the permit application are required to be followed by the operator throughout the mining and reclamation processes.

2.4.2 Exploratory Drilling

To define and characterize the coal resource, the Falkirk Mine conducts coal exploratory drilling by drilling 4.75- to 6-inch bore holes with a mobile rotary drilling rig. The drilling is achieved by air-mist injection or mud circulation depending on the subsurface conditions of the area. A “pilot” hole is drilled before a core hole is drilled. The core hole is drilled as close as possible to the pilot hole. Core holes are drilled on an approximate 1,320-foot grid pattern. In the core hole, rotary drilling is first completed to the top depth of the coal bed, and the coring is then accomplished using a standard split tube core barrel. Once a core sample is removed from the core barrel, it is measured, described, bagged, and sent out for laboratory analysis. A proximate analysis (i.e., percent moisture, ash, sulfur, fixed carbon, volatile matter and calorific content) is conducted on all coal core samples, and ultimate analyses are also conducted for ash fusion temperatures, sulfur forms, and mineral ash constituents.

Information obtained from exploratory drilling includes the thickness and depth of the coal bed(s), as well as coal quality. Each drill hole is geophysically logged for natural gamma, high-resolution density, caliper, and resistance. Coal cropline (subcrop) drilling is also conducted by drilling rotary holes on approximate 300-foot traverses with holes spaced about 100 feet apart on each traverse. Following drilling and logging, each bore hole is plugged by backfilling the holes with the drill cuttings. Excess cuttings are loaded and removed to a predetermined location within the mine site. The Falkirk Mine uses flexible plastic hole plugs, which are placed 3 to 6 feet below the surface to plug the drill holes.



Surface reclamation commences approximately two weeks after each hole is drilled. The affected area is then raked and prepared for seeding.

2.4.3 Surface Water Structures

Prior to any surface disturbance, the mine constructs a network of surface water structures (i.e., sedimentation ponds, pit water ponds, sumps, and diversions). The surface water structures will collect and treat surface runoff from disturbed areas, thereby preventing any additional contribution of suspended solids to waters downstream of the disturbed areas.

2.4.4 Topsoil, Subsoil, and Overburden Removal

Once the surface water structures are constructed, vegetation and suitable plant growth material (SPGM), which consists of the topsoil and subsoil, is removed by using tractor-scrapers and truck shovel fleet. The Falkirk Mine's truck shovel fleet includes loading shovels and end-dump trucks. Removal of SPGM is conducted utilizing two lifts, except in wetland areas. First lift material is topsoil, second lift material is subsoil. Topsoil is removed to depths indicated on the soil survey map or until a color change in the soil is noted, indicating that the subsoil has been encountered. Wetland topsoil is removed down to the zone free of carbonates. The subsoil is then removed by using similar equipment or smaller equipment if conditions are wet. The amount of subsoil removed is dependent upon the volume of topsoil removed. The total volume of topsoil and subsoil removed should be sufficient to respread 24, 26, or 48 inches of material during reclamation, depending on the regraded spoil characteristics. In areas with inadequate volumes of SPGM to meet the respread depth requirements, all available material will be removed and respread uniformly. The SPGM will either be stockpiled in areas designated for topsoil and subsoil stockpiles, or directly respread onto approved regraded areas. Removal of SPGM is conducted approximately 12 to 24 months prior to coal extraction.

As the subsoil removal process is being completed, existing haul roads and pit ramps are extended, or new ones are constructed. Subsoil and other suitable subsoil material will be used to construct haul roads and pit ramps, as described in the Falkirk Mine's state mining permit. Haul road and pit ramp locations are identified to clearly indicate the Falkirk Mine's coal haulage system. Pit ramps will be constructed from the main haul roads at 1,500 to 2,000 foot intervals. Pit ramps run down through the mine spoils until they reach the approximate pit bottom. The current mine plan proposes the construction of two pit ramps in the section 10 lease tract.

Following the removal of the SPGM, the overburden (i.e., material between the SPGM and the first mineable coal bed) is removed. The Falkirk Mine uses two Marion 8750 draglines and two smaller Marion 195-M draglines to remove the overburden. Overburden is spoiled by the dragline using several mining techniques. In most areas where the overburden material is stable, and the overburden thickness is less than 90 feet thick, a simple side casting method is used. As the overburden thickness increases or highwall instability requires additional support, truck shovel fleets will pre-bench ahead of the dragline operation.

2.4.5 Mining and Reclamation

Once all of the overburden has been removed, the coal surface is cleaned with a rubber-tire or track dozer. The coal bed is then ripped to a size that can be effectively loaded into haul trucks with a 10-foot shank mounted on a track dozer. The coal is loaded by either electric shovels or front-end loaders



and hauled by bottom dump coal haulers from the pit to the truck dump facility, where it gets placed into the truck dump coal hoppers. The coal is crushed to approximately 3 inches in diameter and transported in haulage trucks to the Coal Creek Station, where it is burned to produce electricity. A coal stockpile is maintained at the truck dump facility and can be dozed into the coal hoppers push pocket using a rubber-tire or track dozer. A coal stockpile is maintained to ensure a constant flow of coal to the Great River Energy's Coal Creek Station and Spiritwood Station in the event that mining is halted and access to the mining pits is temporarily halted due to inclement weather. In addition, coal stockpiles are maintained and used for coal quality blending to ensure that station quality specifications are maintained.

After the coal is removed, overburden from the new pit cut is spoiled into the empty pit. The reclamation process begins as soon as the overburden is backfilled, followed by subsoil and topsoil placement and revegetation. Spoils are regraded so that no more than four rows of spoil peaks are standing at any one time, except in isolated instances, whereby out of pit spoil must remain to complete the reclamation process. The Falkirk Mine is required to rough grade spoils within 180 days following coal removal. SPGM is replaced using tractor-scrapers and trucks/shovels after the final grade approval has been acquired from the PSC. Global Positioning System (GPS) equipment is used on dozers to ensure the proper respread thicknesses of topsoil and subsoil during reclamation. The Falkirk Mine is required to respread and seed all mined areas within 3 years following coal removal. As soon as topsoil has been respread, farming equipment is used to revegetate and maintain reclaimed areas to the approved post mine land uses, as described in the Falkirk Mine's state mining permit. The mined Federal coal discussed in this EA is sold to the Great River Energy's Coal Creek Station (i.e., electricity generating power plant) and Spiritwood Station (i.e., electricity and steam generating power plant).

Non-coal waste associated with the mining operations such as trees, brush, inert waste from inspected farmsteads, wood materials (e.g., pallets, lumber, lathe, cable spools, and fence posts), brick, concrete block, cured concrete, and plastic materials and pipe are stored in a controlled manner in a designated and approved portion of the mine area. Disposal of the non-coal waste (in the years following the reclamation of a previous waste pit) occurs in approved areas of mining pits within land under the Falkirk Mine ownership.



CHAPTER 3 AFFECTED ENVIRONMENT

This chapter describes the current conditions of the physical, biological, cultural, economic, and social resources that could be affected by the implementation of the Proposed Action and No Action Alternative discussed in **Chapter 2**. In compliance with the requirements of NEPA, and implementing regulations and related guidance, the description of the affected environment focuses on those environmental resources potentially subject to impacts. Please refer to **Table 1, Environmental Assessment Elements**.

Table 1, Environmental Assessment Elements

MANDATORY ELEMENTS	PRESENT; POTENTIALLY IMPACTED	PRESENT; NOT IMPACTED	NOT APPLICABLE OR NOT PRESENT	CHAPTER 3 SECTION
Air Quality	X			Air Quality and Climate Resources (Section 3.1)
Areas of Critical Environmental Concern			X	–
Cultural or Historical Values		X		Cultural Resources (Section 3.2)
Environmental Justice		X		Socioeconomics and Environmental Justice (Section 3.8)
Floodplains			X	–
Invasive, Nonnative Species	X			Vegetation (Section 3.12)
Prime or Unique Farmland	X			Prime and Unique Farmland (Section 3.7)
Threatened and Endangered Species	X			Threatened, Endangered, Proposed, and Candidate Species (Section 3.10)
Wastes, Hazardous or Solids	X			Hazardous Materials and Wastes and Solid Wastes (Section 3.5)
Water Resources	X			Water Resources (Hydrology, Wetlands, Water Quality) (Section 3.14)
Wetland/Riparian	X			Water Resources (Hydrology, Wetlands, Water Quality) (Section 3.14)
Wild and Scenic Rivers			X	–
Wilderness			X	
Other Elements				
Climate Change	X			Air Quality and Climate Resources (Section 3.1)
Economics	X			Socioeconomics and Environmental Justice (Section 3.8)
General Wildlife	X			General Wildlife (Section 3.3)
Geology and Minerals	X			Geological, Mineral, and Paleontological Resources (Section 3.4)
Paleontology	X			Geological, Mineral, and Paleontological Resources (Section 3.4)



MANDATORY ELEMENTS	PRESENT; POTENTIALLY IMPACTED	PRESENT; NOT IMPACTED	NOT APPLICABLE OR NOT PRESENT	CHAPTER 3 SECTION
Range	X			Vegetation (Section 3.12)
Social Conditions	X			Socioeconomics and Environmental Justice (Section 3.8)
Soils	X			Soils (Section 3.9)
General Vegetation	X			Vegetation (Section 3.12)
Visual Resources Management	X			Visual Resources (Section 3.13)
Noise and Vibration	X			Noise (Section 3.6)
Topography	X			Geological, Mineral, and Paleontological Resources (Section 3.4)
Transportation or Traffic	X			Transportation Resources (Section 3.11)

3.1 Air Quality and Climate Resources

In accordance with Federal Clean Air Act (CAA) requirements, the air quality in a given region or area is measured by the concentration of criteria pollutants in the atmosphere. The air quality in a region is a result of not only the types and quantities of atmospheric pollutants and pollutant sources in an area, but also surface topography and the prevailing meteorological conditions.

3.1.1 Existing Air Quality and Climate Conditions

Air quality for any area is generally influenced by the types and quantities of air pollutant emissions released from natural and man-made sources within and upwind of the area. Additionally, the local topography, or terrain (such as mountains and valleys), and weather (such as wind, temperature, air turbulence and pressure, humidity, etc.) will have a direct effect on the how pollutants form, react, disperse, or accumulate. Ambient air quality in the affected area is assessed by conducting air monitoring for ground level air pollutant concentrations and comparing to air quality standards established to protect human health and welfare.

The Environmental Protection Agency (EPA) has primary responsibility for setting ambient air quality standards, including those for six criteria air pollutants subject to National Ambient Air Quality Standards (NAAQS). Pollutants regulated under NAAQS include carbon monoxide (CO), lead, nitrogen dioxide (NO₂), ozone, particulate matter with a diameter less than or equal to 10 microns (PM₁₀), particulate matter with a diameter less than or equal to 2.5 microns (PM_{2.5}), and sulfur dioxide (SO₂). Nitrogen oxides (NO_x) and volatile organic compounds (VOCs) contribute to ozone formation in the atmosphere and are regulated through equipment standards and emissions limits. Hazardous air pollutants (HAPs) and greenhouse gases (GHGs) are two other categories of regulated air pollutants due to their impacts on human health and global climate change, respectively. The EPA also sets emission standards for many types of equipment and activities that generate emissions of these air pollutants. EPA has delegated responsibility for many provisions of the Clean Air Act to the State of North Dakota Department of Health (NDDH). NDDH has also promulgated state ambient air quality Standards (SAAQS) for criteria pollutants. In addition, the State of North Dakota has set ambient air



quality standards for hydrogen sulfide (H₂S) and ammonia (NH₃). The NAAQS and NDAAQS for criteria pollutants are summarized in **Table 2, National and State Ambient Air Quality Standards**.

Table 2, National and State Ambient Air Quality Standards

POLLUTANT	AVERAGING TIME	PRIMARY STANDARD		SECONDARY STANDARD
		FEDERAL	STATE	
CO	8-hour	9 ppm ^(a)	9 ppm	None
	1-hour	35 ppm ^(a)	35 ppm	None
Pb	Rolling 3-Month Average	0.15 µg/m ³ ^(b)	0.15 µg/m ³	Same as Primary
NO₂	Annual Arithmetic Mean	53 ppb ^(c)	0.053 ppm	Same as Primary
	1-hour	100 ppb ^(d)	0.1 ppm	None
PM₁₀	24-hour	150 µg/m ³ ^(e)	150 µg/m ³	Same as Primary
PM_{2.5}	Annual Arithmetic Mean	12 µg/m ³ ^(f)	12 µg/m ³	15 µg/m ³
	24-hour	35 µg/m ³ ^(g)	35 µg/m ³	Same as Primary
O₃	8-hour	0.070 ppm ^(h)	0.075 ppm	Same as Primary
SO₂	3-hour	--	0.5 ppm	0.5 ppm
	1-hour	75 ppb ⁽ⁱ⁾	0.075 ppm	None
H₂S	Instantaneous	None	10 ppm	None
	1-Hour	None	0.2 ppm	None
	24-Hour	None	0.1 ppm	None
	3-Month	None	0.02 ppm	None
NH₃	1-hour	None	0.2 ppm	None

Sources: EPA 2015a, NDAC 2014

Key: ppm = parts per million; ppb = parts per billion; µg/m³ = micrograms per cubic meter

Notes: Parenthetical values are approximate equivalent concentrations.

- Not to be exceeded more than once per year.
- Final rule signed 15 October 2008.
- The official level of the annual NO₂ standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of cleaner comparison to the 1-hour standard.
- To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 100 ppb (effective 22 January 2010).
- Not to be exceeded more than once per year on average over 3 years.
- Final rule signed October 1, 2015, and effective December 28, 2015. To attain this standard, the 3-year average of the weighted annual mean PM_{2.5} concentrations from single or multiple community-oriented monitors must not exceed 12 µg/m³.
- To attain this standard, the 3-year average of the weighted annual of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m³.
- Final rule signed October 1, 2015 and effective December 28, 2015. To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.070 ppm.
- To attain this standard, the 3-year average of the 99th percentile of daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb. Final rule signed 2 June 2010.



NDDH, Air Quality Division operates and maintains a network of Ambient Air Quality Monitoring (AAQM) sites throughout the state. The nearest upwind AAQM sites to the section 10 lease tract are the Beulah North AAQM site, located approximately 30 miles southwest, and Hannover AAQM site, located approximately 20 miles southwest. The nearest downwind AAQM site to the section 10 lease tract is the Fargo NW AAQM site, approximately 205 miles to the southeast. The Beulah North AAQM site measures SO₂, NO₂, O₃, PM_{2.5}, PM₁₀, and NH₃. The Hannover AAQM site measures SO₂, NO₂, O₃, PM_{2.5}, and PM₁₀. The Fargo NW AAQM site measures SO₂, NO₂, O₃, CO, PM_{2.5}, PM₁₀, and total reactive nitrogen oxides (NO_y). Table 3 summarizes the monitoring results reported in 2014 for the Beulah North, Hannover, and Fargo NW monitoring sites. Monitoring data indicate that Federal and state ambient air quality standards were met at the Beulah North, Hannover, and Fargo NW monitoring sites in 2014. There is no Federal standard for NH₃; however, the state standard for NH₃ (0.2 ppm [280 µg/m³] [1-hour]) was not exceeded at the Beulah North AAQM site in 2014 (NDDH 2015). Please refer to **Table 3, 2014 Monitoring Results for Beulah North, Hannover, and Fargo NW AAQM Sites**.

Table 3, 2014 Monitoring Results for Beulah North, Hannover, and Fargo NW AAQM Sites

CRITERIA POLLUTANT MONITORED	BEULAH NORTH AAQM SITE	HANNOVER AAQM SITE	FARGO NW AAQM SITE
CO (1-hour)	Not Monitored	Not Monitored	0.57 ppm
CO (8-hour)	Not Monitored	Not Monitored	0.3 ppm
SO ₂ (1-hour)	0.023 ppm	0.024 ppm	0.003 ppm
SO ₂ (24-hour)	0.0064 ppm	0.0028 ppm	0.0009 ppm
SO ₂ (Annual Average)	0.0012 ppm	0.00086 ppm	0.00016 ppm
NO ₂ (1-hour)	0.024 ppm	0.016 ppm	0.035 ppm
NO ₂ (Annual Average)	0.0033 ppm	0.0022 ppm	0.0044 ppm
O ₃ (8-hour)	0.058 ppm	0.059 ppm	0.060 ppm
PM _{2.5} (24-hour)	17 µg/m ³	16 µg/m ³	19 µg/m ³
PM _{2.5} (3-year Average)	6.0 µg/m ³	5.2 µg/m ³	7.1 µg/m ³
PM ₁₀ (24-hour)	55 µg/m ³	80 µg/m ³	39 µg/m ³
NH ₃ (1-hour)	0.0048 ppm	Not Monitored	Not Monitored

Source: NDDH 2015

Key: ppb = parts per billion; µg/m³ = micrograms per cubic meter

The climate of North Dakota is characterized by large seasonal temperature variations; light to moderate, irregular precipitation; plentiful sunshine; low humidity; and almost continuous wind. The annual average temperature ranges from about 37 degrees Fahrenheit (°F) in the northeastern part of the state to 44°F along most of the southern border. Annual average precipitation ranges from about 14 to 22 inches and winter snowpack averages 9 to 15 inches, depending on the area of the state. In the western portion of the state, prevailing wind directions are west, northwest, and north during most of the year, although this depends somewhat on the season.

The average wind speeds in McLean County are from 9 to 11 miles per hour (mph) (USDA 1979). Bismarck, North Dakota, is the nearest weather station for which a number of years of data are



available. Average values of monthly wind speed and direction from the Bismarck weather station are shown in Table 4. Please refer to **Table 4, Average Monthly Wind Speeds and Direction**.

Table 4, Average Monthly Wind Speeds and Direction

MONTH	WIND SPEED (MPH)	PREVAILING WIND DIRECTION
January	10.1	Northwest
February	10.1	Northwest
March	11.1	Northwest
April	12.3	West
May	12.0	Northwest
June	10.8	North
July	9.5	West
August	9.7	South
September	10.2	Northwest
October	10.1	West
November	10.3	Northwest
December	9.6	Northwest

Source: NOAA 1979

3.1.2 Air Resource Regulatory Programs

The Clean Air Act specifies standards and requirements to control air pollution and directs the EPA to develop air quality regulations and programs. EPA may delegate authority to implement air quality programs and regulations to a state that develops and obtains approval of a State Implementation Plan (SIP). SIPs are prepared by states and submitted to the EPA for approval to meet specific requirements of the CAA, including the requirement to attain and maintain the NAAQS. SIPs describe how the plan, including any rules or other requirements, will comply with these requirements and maintain the NAAQS. The NDDH has an approved SIP and has the authority to regulate and issue air permits to major and minor sources of regulated air pollutants within North Dakota. Because the Falkirk Mine is not a major source of air pollutants, it is not subject to the Federal Prevention of Significant Deterioration (PSD) program or to the Title V Operating Permit Program. However, the NDDH has issued an Air Pollution Control Minor Source Permit to Operate for the Falkirk Mine (Permit Number O79002, April 2016).

The EPA is also responsible for classifying air quality in specified geographic areas. The area may be comprised of one or more counties, a whole state, or a several state region. Depending on the pollutant, air quality for a given geographic area is designated as either attainment, or nonattainment. Attainment areas are those areas where criteria pollutant concentrations in ambient air do not exceed of the NAAQS have been documented, but pollution concentrations no longer exceed NAAQS concentrations, i.e. Attainment/Maintenance areas. As of October 1, 2015, the EPA has classified the entire State of North Dakota as in attainment for all criteria air pollutants (EPA 2015b).

Air sheds are also assigned a priority Class (I, II, or III) which describes how much degradation to the existing air quality is allowed to occur within the area under the Prevention of Significant



Deterioration (PSD) regulations. Class I areas are areas of special national or regional natural, scenic, recreational, or historic value, and essentially allow very little degradation in air quality (i.e. National Parks, Wilderness Areas), while Class II areas allow for reasonable economic growth. There are currently no Class III areas defined in North Dakota.

There are four Class I Areas located in North Dakota: Theodore Roosevelt National Park – North Unit (McKenzie County), Theodore Roosevelt National Park – Elkhorn Ranch Unit (Billings County), Theodore Roosevelt National Park – South Unit (Billings County), and Lostwood National Wilderness Area (Burke County). The primary anthropogenic sources of visibility impairment in North Dakota Class I Areas include electric utility steam generating units, energy production and processing sources, agricultural production and processing sources, prescribed burning, and fugitive dust sources (NDDH 2010). The section 10 lease tract is not located within a North Dakota Class I Area. The nearest North Dakota Class I Area to the section 10 lease tract is the Theodore Roosevelt National Park – North Unit (McKenzie County). This Class I Area is located more than 105 miles away, generally upwind of the section 10 lease tract.

3.1.3 Climate Change and Greenhouse Gas Emissions

Greenhouse gases (GHGs) permit incoming (short-wave) radiation from the sun to enter the earth's atmosphere, but block infrared (long-wave) radiation from leaving the earth's atmosphere. This "greenhouse effect" traps radiation from the sun and warms the planet's surface. GHGs include, carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), ozone, fluorocarbons, and sulfur hexafluoride gases. Many GHGs are naturally occurring in the environment; however, human activity has contributed to increased concentrations of these gases in the atmosphere. As GHG concentrations increase in our atmosphere they impact the global climate by further decreasing the amount of heat that is allowed to escape back into space. Carbon dioxide is emitted from the combustion of fossil fuels (i.e., oil, natural gas, and coal), solid waste, trees and wood products, and also as a result of other chemical reactions (e.g., manufacture of cement). Methane results from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills. Methane is also emitted during the production and transport of coal, natural gas, and oil. Nitrous oxide is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste. Fluorinated gases, while not abundant in the atmosphere, are powerful GHGs that are emitted from a variety of industrial processes and are often used as substitutes for ozone-depleting substances (e.g., chlorofluorocarbons, hydrochloroflourocarbons, and halons).

In 2014, the Intergovernmental Panel on Climate Change (IPCC) produced the Climate Change Synthesis Report and Summary for Policymakers. The Report states that anthropogenic (i.e., human- caused) GHG emissions have increased since the preindustrial era, driven largely by economic and population growth, and are now higher than they have ever previously recorded. This has led to atmospheric concentrations of carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O) that are unprecedented in at least the last 800,000 years. These anthropogenic GHG emissions are "extremely likely" to have been the dominant cause of the observed warming since the mid-20th century. According to the IPCC Report, many regions are experiencing climate change impacts that threaten ecosystems, human health, and infrastructure. Increasing temperatures and changing precipitation (including melting snow and ice) are altering hydrological systems and affecting water resources (quantity and quality). Terrestrial, freshwater, and marine species have shifted their geographic ranges,



seasonal activities, migration patterns, abundance, and species interactions. Negative impacts on crop yields and forests are more common. In addition, ocean acidification is negatively affecting marine organisms, and sea level rise is threatening ecosystems, human health, and infrastructure (IPCC 2014). Factors that determine a GHG effect on climate change include its concentration, duration, and Global Warming Potential (GWP). The GWP is determined by the length of time a GHG remains in the atmosphere and the strength with which it absorbs energy. In order to aggregate GHG emissions, total GHG emissions are characterized in terms of CO₂ equivalent (CO₂eq) by adding the product of each GHG multiplied by its GWP. CO₂ has a GWP of 1, while CH₄ and N₂O have GWPs of 25 and 298, respectively, based on 100- year GWPs (40 CFR Part 98, Table A-1).

The EPA collects GHG emissions data in the U.S. by source sector (e.g. industrial, land use, electricity generation), fuel source (e.g. natural gas, coal, geothermal), and economic sector (e.g. industrial, commercial, residential). Considering the diverse sources of GHG emissions nationally, from cattle to vehicles to electric power generation, no single source is likely to represent a significant percentage of national emissions. Total GHG emissions for the U.S. are presented in **Table 5, U.S. GHG Emissions Trends by Gas and Selected Sectors 1990 – 2014** by GHG and for selected source sectors. According to the U.S. Energy Information Administration (EIA), U.S. coal production from surface mines in 2014 was 643,721,158 short tons of which 29,157,193 short tons (approximately 4.5%) were produced from four surface coal mines in North Dakota. Corresponding estimated GHG emissions from surface mining and post mining activities in 2014 were 11.7 MMT CO₂eq from all U.S. surface mines, and 0.14 MMTCO₂eq from North Dakota surface mines.

Surface mining operations can emit greenhouse gas emissions depending on the coal characteristics and operational methods used. CO₂ and N₂O may be emitted from mining operations that involve the combustion of fossil fuels such as diesel fired equipment and generators, onsite energy production, or for heating and cooling. CH₄ may be released into the atmosphere as the overburden is removed and coal is exposed. CH₄ is naturally generated in coal beds as a result of the coalification process (coal formation from organic matter). Some of this methane remains “trapped” in the coal if the coal bed occurs within non-porous strata such as claystone and shale. The amount of CH₄ released during coal mining depends on a number of factors, including the type of coal and how it was formed, coal seam depth, and method of mining. In addition, CH₄ may be released during post- mining activities (i.e., coal handling) as the coal is processed, transported, and stored for use. In general, emissions from these sources are low because much of the CH₄ is emitted during the mining process.



Table 5, U.S. GHG Emissions Trends by Gas and Selected Sectors 1990 – 2014

GHG Selected Sector	1990 (MMT CO _{2eq})	2005 (MMT CO _{2eq})	2010 (MMT CO _{2eq})	2014 (MMT CO _{2eq})
CO₂	5,115	6,123	5,689	5,556
Fossil Fuel Combustion	4,741	5,747	5,358	5,208
Electricity Generation	1,821	2,401	2,258	2,039
Transportation	1,494	1,887	1,728	1,738
Industrial	843	828	776	813
Residential	338	358	335	345
Commercial	217	224	220	232
Non-Energy Use of Fuels	118	139	114	114
Iron and Steel Production & Metallurgical Coke Production	100	67	56	55
Natural Gas Systems	38	30	32	42
Cement Production	33	46	31	39
Petrochemical Production	22	27	27	27
CH₄	774	717	722	731
Natural Gas Systems	207	177	166	176
Enteric Fermentation	164	169	171	164
Landfills	180	154	142	148
Petroleum Systems	39	49	54	68
Coal Mining	97	64	82	68
Manure Management	37	56	61	61
Wastewater Treatment	16	16	16	15
N₂O	406	398	410	404
Agricultural Soil Management	303	297	321	318
Stationary Combustion	12	20	22	23
Manure Management	14	17	17	18
Mobile Combustion	41	34	24	16
HFCs, PFCs, and SF₆	47	120	149	167
Substitution of Ozone Depleting Substances	0.3	100	141	161
HCFC-22 Production	46	20	8	5
Electrical Transmission and Distribution	25	11	7	6
Aluminum Production	22	3	2	3
Total Emissions	6,397	7,379	6,986	6,871
Land Use, Land-Use Change, Forestry (sinks)	-738	-699	-766	-763
Net Emissions (Sources and Sinks)	5,659	6,680	6,219	6,108

Source: EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2014 (April 2016).



3.2 Cultural Resources

Common types of prehistoric archaeological sites in North Dakota include lithic artifact scatters, earthlodge villages, stone circles, short-term camp sites, stone cairns, rock art, and Knife River Flint tool stone quarries. Also common to a lesser degree are animal bone concentrations resulting from game drives, vision quest stations, eagle-trapping pits, stone alignments, and scatters of artifacts that include ceramics or factory-made trade goods. Well-stratified, multiple-component sites, which are typically significant sites, have been found in remnant alluvial fans, stream terraces, spring deposits, and the terraces lining the Missouri and Little Missouri rivers. Common historic archaeological sites in the state are the remains of homesteads, farmsteads, dumps, schools, churches, roads, railroad grades, trails, trading posts, and military forts.

In 1993, a Class III Cultural Resources Inventory was completed for the southeast $\frac{1}{4}$ of section 10, Township 146 North, Range 82 West (160 acres).

A Class I literature review of the State Historical Society of North Dakota (SHSND) site and manuscript files was conducted for the entire project area on March 27, 2015. The review revealed 16 previous cultural resource surveys, 32 sites, 15 isolated finds, and two site leads within a 1-mile radius of the project area. There are four isolated finds (32MLx785, 32MLx605, 32MLx606, and 32MLx607), one site lead (32MLx50), and one site (32ML837) within the previously surveyed area (160 acres). The four isolated finds (32MLx785, 32MLx605, 32MLx606, and 32MLx607), by definition, are considered “not eligible” for the NRHP.

A Class III pedestrian cultural resource inventory was conducted on April 30, 2015 (BLM# 15-MT030-176), for the northeast $\frac{1}{4}$ of section 10, Township 146 North, Range 82 West (160 acres). The area was surveyed using parallel pedestrian transects spaced no more than approximately 49 feet apart. Site lead 32MLx50 (i.e., single stone circle) could not be located during the 2015 Class III inventory. Site lead 32MLx50 has either been destroyed by agricultural activities or is located outside the mapped location and project area. Site 32ML837 is a historic farmstead and was previously recommended “not eligible” for the NRHP. Only one new cultural resource (i.e., isolated find 32MLx785) was discovered during the 2015 Class III inventory. Isolated find 32MLx785 is a single tertiary flake of Knife River Flint, measuring approximately 1.2 inches long, 0.8 inches wide, and 0.4 inches thick. It was located on a ridge with a large pond to the west in a harvested sunflower field (ground surface visibility at 75 percent). The single flake could not be associated with a nearby previously recorded site and was found out of context; therefore, it was recorded as an isolate and is “not eligible” for the NRHP. Seven rock piles were also recorded and determined by a KLJ archaeologist to be modern, showing no signs of being exposed to the elements for an extended period of time.

The Class III survey report (BLM# 15-MT030-176), which covers the surface area not previously archaeologically surveyed, and a cover letter detailing the BLM’s findings were submitted to the North Dakota State Historical Preservation Office (SHPO). A concurrence letter from the North Dakota SHPO was received on June 29, 2015, providing a finding of “No Historic Properties Affected” if the project proceeds as currently planned.

A letter detailing the proposed project, a map of the project location, and a Class I cultural resource packet was submitted to each Tribal Historic Preservation Officer (THPO) of the following tribes: the Mandan, Hidatsa, and Arikara Nation (MHAN); Lower Sioux Indian Community (LSIC); Fort Peck Tribes



(FPT); Northern Cheyenne Tribe (NCT); Spirit Lake Sioux Tribe (SLST); Standing Rock Sioux Tribe (SRST); and Turtle Mountain Band of Chippewa (TMBC). The Class III survey report (BLM# 15-MT030-176) and a cover letter detailing the BLM's findings was also submitted to the THPO of the following tribes: the MHAN, LSIC, FPT, NCT, SLST, SRST, and TMBC. To date, the BLM has not received any comments or concerns regarding the Proposed Action or Class III survey report from the aforementioned tribes or their THPOs.

3.3 General Wildlife

The Migratory Bird Treaty Act of 1918 (MBTA) (16 U.S.C. 703-712) as amended, and EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, require Federal agencies to minimize or avoid impacts on migratory birds listed in 50 CFR 10.13. If design and implementation of a Federal action cannot avoid measureable negative impacts on migratory birds, EO 13186 directs the responsible agency to develop and implement, within 2 years, a Memorandum of Understanding with the USFWS that shall promote the conservation of migratory bird populations. Bald and golden eagles are provided protection under the Bald and Golden Eagle Protection Act of 1940 (16 U.S.C. 668–668c), as amended.

The section 10 lease tract is located within the Central Flyway of North America. The Central Flyway is used as resting grounds for many bird species on their spring and fall migrations and nesting and breeding grounds for many waterfowl species. Wildlife species and habitat surveys were conducted across the southern half of the section 10 lease tract from 1992 to 1993 and 2005 to 2006. For purposes of this analysis, it is assumed that species and habitats observed in the southern half of the section 10 lease tract can also be found in the northern half of the lease tract. The objective of the wildlife species and habitat surveys conducted in the section 10 lease tract was to provide site-specific information regarding the terrestrial and aquatic wildlife resources present within the tract.

A variety of species were observed to be using wetlands, croplands, tame grasslands, and pasture lands in the section 10 lease tract as habitat. Several upland game birds, migratory waterfowl, shorebirds, song birds, and mammals of varying sizes were observed such as the sharp-tailed grouse (*Tympanuchus phasianellus*), Canada geese (*Branta canadensis*), Ferruginous hawk (*Buteo regalis*), Richardson ground squirrel (*Urocitellus richardsonii*), and coyote (*Canis latrans*). No bald or golden eagles were observed during the surveys. A detailed list of wildlife species observed during the surveys of the section 10 lease tract is provided in Section 2-4 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. Please refer to **Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations**.

3.4 Geological, Mineral, and Paleontological Resources

Geological resources consist of surface and subsurface minerals. Within a given physiographic province, these resources typically are described in terms of physiography, topography, geology, and paleontology. Topography and physiography pertain to the general shape and relief of the land surface, including the elevation and orientation of its natural features and human-made alterations. Geology is the study of the Earth's composition and provides information on the structure and configuration of its surface and subsurface features. Paleontological resources (i.e., fossils) are nonrenewable resources that provide evidence of past life on Earth.



Geological Resources

Some of the text contained in this subsection was obtained from Section 2-3 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. Please refer to **Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations**. The section 10 lease tract occurs in the portion of the Falkirk Mine's reserve area known as the Underwood Coal Field. The Underwood Coal Field is situated on the Coteau Slope, located southwest of the Missouri Coteau, and northeast of the Missouri Trench. This area is a local physiographic feature within the Northern Great Plains Physiographic Province designated by Fenneman.

The Coteau slope consists primarily of stream-dissected bedrock covered with a veneer of glacial deposits (Bluemle, 1971). Structurally, the area is situated on the eastern flank of the Williston Basin, which is an intercratonic basin containing a thick sequence of sedimentary rocks. The sedimentary rocks in the Williston Basin represent deposition from every geologic period from the Cambrian period (500 to 600 million years ago) through the Tertiary period (3 to 65 million years ago). The near-surface stratigraphy of the section 10 lease tract is derived from terrestrial sediments and the accumulation and preservation of peat in regional swamps. The sediments comprising the strata were transported eastward, from western source areas by Early Tertiary fluvial systems.

After the close of the Oligocene Epoch (26 million years ago), erosion was the predominant geologic process affecting the Williston Basin. The area was affected by all four of the major Pleistocene glaciations (10,000 to 900,000 years ago). Each glacial episode modified the previous landscape through erosional and depositional processes. The area was most recently glaciated during the Wisconsinan stage. During early Wisconsinan time (50 thousand years ago), the Napoleon sheet ice advanced across the area depositing drift on a rolling topography that consisted mainly of bedrock with only a thin veneer of pre-Wisconsinan drift deposited in the topographic lows. Most of the pre-Wisconsinan drift had been removed by erosional processes by the time the Napoleon ice sheet advanced across the area. The present topography of the area consists mainly of stream-dissected bedrock covered with a veneer of glacial sediment. A few buried glacial meltwater channels are also present in the area. Post-glacial erosion has been very minor over most of the area. Thin surficial deposits of slopewash (i.e., clays and silts) and eolian deposits of the Oahe Formation occur over most of the area.

The extreme northeastern corner of McLean County is part of the Drift Prairie that covers most of the northeastern portion of North Dakota. Relief in this area, which is generally less than 20 feet per mile, is almost entirely attributed to irregularities on the surface of the glacially deposited ground moraine. The edge of the Drift Prairie is marked by the Missouri Escarpment, a relatively smooth, but stream-dissected slope feature that rises to the Missouri Coteau. Elevations rise from approximately 1,600 feet at the base of the escarpment to more than 2,000 feet at the top, which equates to a change of about 400 feet in a distance of about 5 miles. The Missouri Coteau, which lies at the top of the Missouri Escarpment, is an area of high local relief, averaging approximately 30 to 35 feet between lows and adjacent highs. This hilly area extends from eastern-central South Dakota, northwest to Saskatchewan. The Coteau Slope lies southwest of the Missouri Coteau. Relief is moderate, generally less than 25 feet locally, but greater near some of the deeper valleys. Elevations range between approximately 2,000 feet near the Missouri River, to more than 2,400 feet in the western part of the county (Bluemle 1971).



Mineral Resources

Some of the text contained in this subsection was obtained from Section 2-3 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. Please refer to **Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations**. The mineable lignite coal in the Underwood Coal Field occurs in the Sentinel Butte Formation (part of the Fort Union Group). The U.S. Geological Survey (USGS) completed an assessment of the undiscovered oil and gas resources in conventional and continuous accumulations of the Williston Basin Province of North Dakota based on geological elements of total petroleum systems. Results of the assessment determined that for continuous (unconventional) gas resources, there is a 95 percent chance of approximately 368 billion cubic feet (ft³), 50 percent chance of approximately 791 billion ft³, and 5 percent chance of approximately 1,701 billion cubic ft³ of gas in the Fort Union coal bed assessment unit. No continuous or conventional oil resources were identified for the Fort Union coal bed assessment unit (USGS 2010). There is no clinker (i.e., scoria) present within the section 10 lease tract.

The near-surface lithostratigraphy of the section 10 lease tract is variable and is mapped as the Bullion Creek, Sentinel Butte, Coleharbor, and Oahe formations. Figure 4 displays the stratigraphic column representing the lease tract, showing the coal zones occurring in the Fort Union Group and other geologic formations. Please refer to **Figure 4, Local Stratigraphic Column in the Vicinity of the Section 10 Lease Tract**.



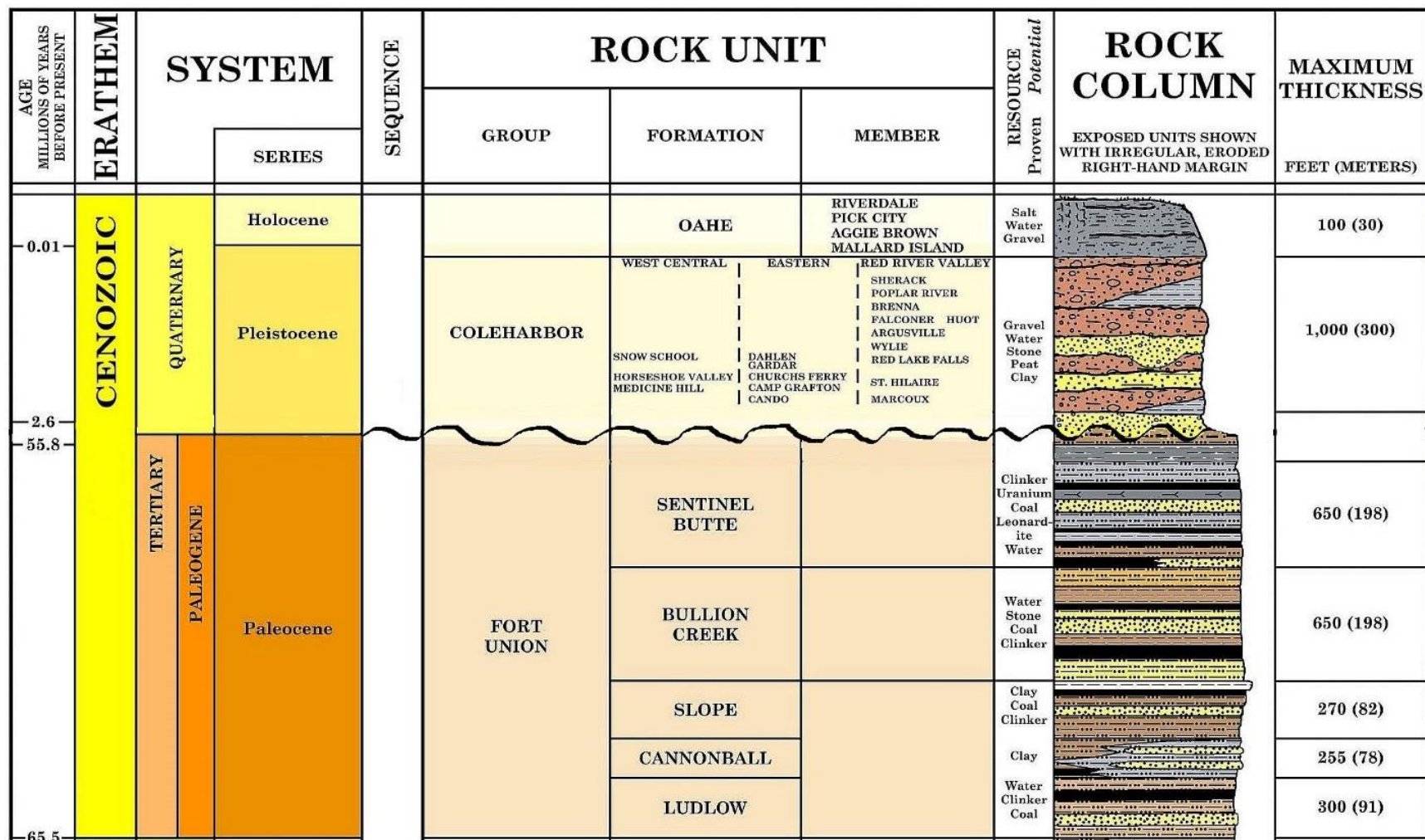


Figure 4, Local Stratigraphic Column in the Vicinity of the Section 10 Lease Tract



The lignite coal bearing Sentinel Butte and Bullion Creek formations occur within the section 10 lease tract. The Sentinel Butte Formation conformably overlies the Bullion Creek Formation. Lithologically, the two formations are very similar: interbedded silts and clays that occur in horizons that range in thickness from 0 to 10 feet make up approximately 60 to 80 percent of the sediment; 15 to 35 percent of the sediment consists of silty, fine-grained to medium-grained sand in horizons that range in thickness from 0.5 to 100 feet; and lignite is a minor constituent that generally comprises less than 5 percent of the formation. The lignite occurs in beds that range in thickness, from less than 0.1 to 15 feet locally.

The Coleharbor Formation unconformably overlies the Sentinel Butte Formation and includes all of the unconsolidated sediments resulting from deposition during the glacial and interglacial periods. Lithologies are locally variable, including gravel, sand, silt, clay, and till. The Oahe Formation conformably overlies the Coleharbor Formation and occurs over most of the section 10 lease tract as a thin veneer of eolian silt-sized sediment that blankets upland surfaces. The Oahe Formation is the uppermost stratigraphic unit over most of the area. The modified glacial channels that delineate the mining limits north, east, and south of the section 10 lease tract are in-filled with sediments comprising the Coleharbor Formation. The channel fill systems contain a complex of interbedded glacial-derived fluvial gravels, sands, silts, and clays that are overlain by till. The coarser gravel and sand beds are generally limited to near the bottom of the channel fill.

The uppermost stratigraphic unit within the Falkirk Mine area is glacial till that generally consists of a pebble loam that ranges in thickness, from 0 to 30 feet, and usually averages 5 feet thick. Underlying this unit, are overburden; a series of lignite coal beds; and interburden, which occurs between successive coal beds. The overburden thickness can range between 10 and 220 feet thick over the mine area. The overburden and interburden materials generally consist of silty sandstone, clayey siltstone, and claystone. Most of the coal beds in the area are fairly continuous and contain claystone partings. In some areas, the partings become thick enough to cause the coal bed to split into two beds or benches. The thickness and areal extent of the partings are extremely variable. The Falkirk Mine staff stated that when a parting attains a thickness of approximately 0.3 feet, it can be removed from the coal bed and discarded.

The uppermost coal bed occurring in the area is the Kinneman Creek bed. This coal bed contains partings and is not mined due to its limited areal extent and poor quality (i.e., high ash content). Occurring approximately 25 to 70 feet below the Kinneman Creek bed is the Hagel A bed. The Hagel A bed is the uppermost mineable coal bed in the Falkirk Mine area and can contain parting(s). In some areas, the parting thickness increases to where the coal bed splits into two mineable beds that are referred to as the Hagel A-1 (upper bed) and the underlying Hagel A-2 (lower bed). The Hagel A bed averages 5.7 feet thick and ranges from 0.5 to 11.5 feet thick.

The Hagel B bed underlies the Hagel A bed, and in some areas, it nearly coalesces with the overlying Hagel A bed. The interburden thickness between the Hagel A and Hagel B beds is usually less than 10 feet, but can range from approximately 0.1 to 35 feet. The Hagel B bed is mineable and can contain parting(s). In some areas, the Hagel B bed splits into two mineable beds: the Hagel B-1 (upper bed) and the Hagel B-2 (lower bed). The Hagel B lignite bed averages 1.8 feet thick and ranges from 0.5 to 6.3 feet thick. The Hagel A and Hagel B beds are fairly continuous across the Falkirk Mine area. However, in some areas, the beds have been removed by erosion.



Occurring approximately 30 feet below the Hagel B bed is the C bed. Within the Falkirk Mine area, the C bed has a limited areal extent. However, this bed is mined in areas where its thickness and quality are suitable. The C bed is typically less than 2 feet thick. Occurring approximately 65 feet below the C bed is the Tavis Creek bed. The Tavis Creek bed is the thickest and most continuous coal bed across the Falkirk Mine area. The Tavis Creek bed averages 8.2 feet thick and ranges from 0.5 to 12.2 feet thick. Because of its depth, this bed is mined in areas where erosion has removed a significant amount of the overlying stratigraphic units. In some areas, a thin “rider” coal bed occurs several feet above the Tavis Creek bed. The Tavis Creek bed can contain parting(s), and in some areas, the coal bed is split into two mineable beds consisting of the Upper Tavis Creek and Lower Tavis Creek beds.

The lowest mineable coal bed in the Falkirk Mine area is the Coal Lake Coulee bed, which occurs approximately 25 to 50 feet below the Tavis Creek bed. Although thinner than the overlying Tavis Creek bed, the Coal Lake Coulee bed has a similar areal extent. The Coal Lake Coulee bed averages 2.5 feet thick and ranges from 0.5 to 3.8 feet thick. This coal bed also contains parting(s) and in some areas, the bed is split into the Upper Coal Lake Coulee and Lower Coal Lake Coulee beds.

Within the section 10 lease tract (in the Underwood Coal Field), the Hagel A and Hagel B beds are targeted for mining. Figure 5 shows a depiction of the coal bed layers associated with mining activities in the section 10 lease tract. Please refer to **Figure 5, Falkirk Mine Coal Bed Stratigraphy**.



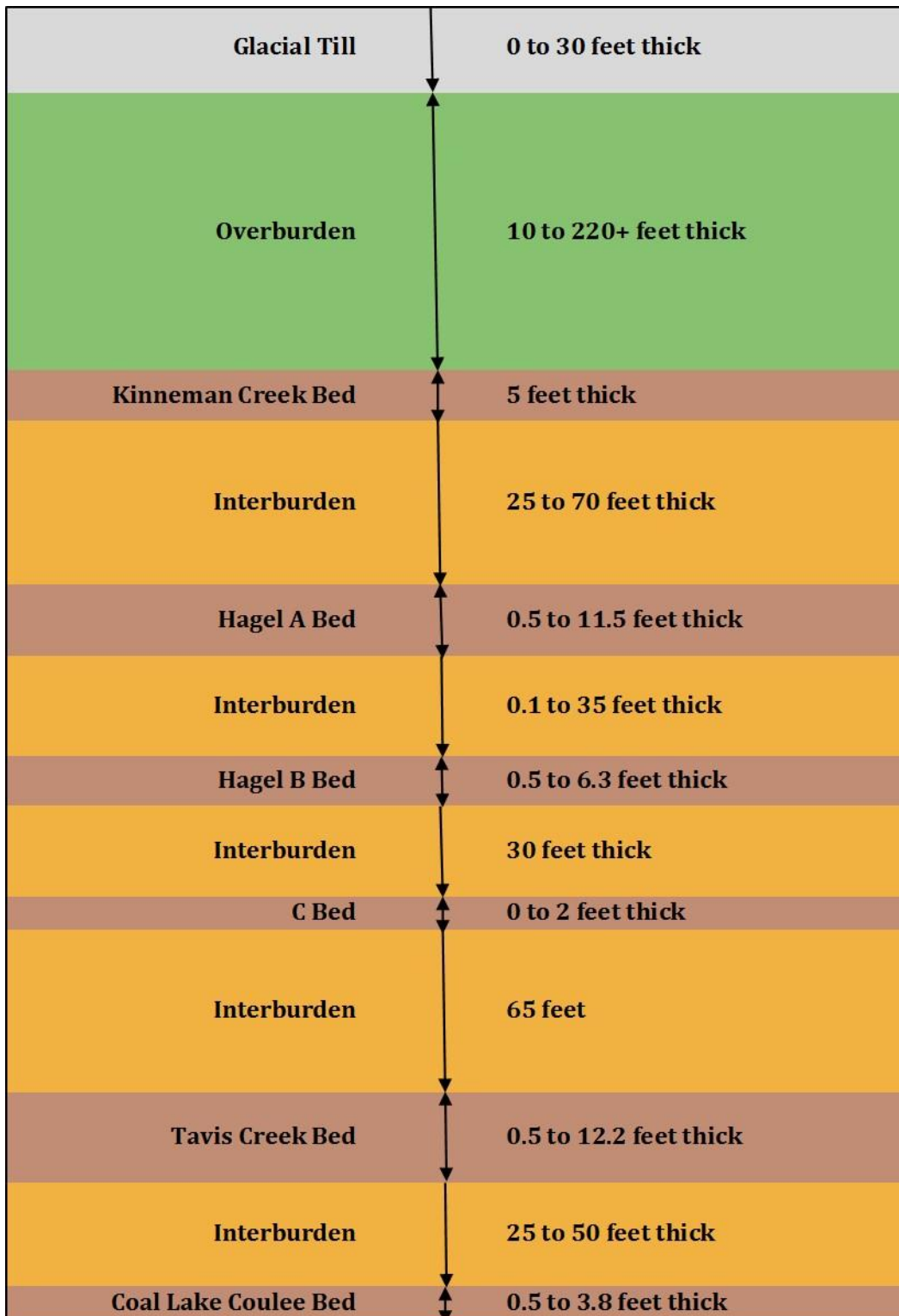


Figure 5, Falkirk Mine Coal Bed Stratigraphy¹

¹ All values are approximate.

Paleontological Resources

Surface-disturbing actions have the potential to impact paleontological resources. The BLM uses the Potential Fossil Yield Classification (PFYC) system to classify paleontological resource potential of rock units to assess potential impacts on these resources and determine mitigation requirements for Federal actions involving surface disturbance, land tenure adjustments, or land use planning, where impacts on paleontological resources would be expected. The PFYC system classifies geologic units based on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts, with a higher class number indicating a higher fossil potential. The classification values are as follows:

- ◆ Class 1—Very Low. Geologic units are not likely to contain recognizable fossils. Management concern is usually negligible or not applicable.
- ◆ Class 2—Low. Sedimentary geologic units are not likely to contain vertebrate fossils or scientifically significant non-vertebrate fossils. Management concern is generally low.
- ◆ Class 3—Moderate or Unknown. Fossiliferous sedimentary geologic units where fossil content varies in significance, abundance, and predictable occurrence, or sedimentary units of unknown fossil potential. Management concern is moderate or cannot be determined from existing data.
- ◆ Class 4—High. Geologic units containing a high occurrence of significant fossils. Vertebrate fossils or scientifically significant invertebrate or plant fossils are known to occur and have been documented, but might vary in occurrence and predictability. Surface disturbing activities could adversely affect paleontological resources in many cases. Management concern is moderate to high, depending on the project.
- ◆ Class 5—Very High. Highly fossiliferous geologic units that consistently and predictably produce vertebrate fossils or scientifically significant invertebrate or plant fossils, and that are at risk of human-caused adverse effects or natural degradation. Management concern is high to very high.

As part of the Proposed Action, overburden would be removed from over the top of the targeted coal bed(s). The overlying beds include rocks mapped as the Sentinel Butte, Coleharbor, and Oahe formations. The Sentinel Butte Formation is part of the Fort Union Group in North Dakota; has produced significant flora, clam, insect, fish, bird, and mammal fossils; and is rated as Class 4 (high) under the PFYC system. The Coleharbor Formation and Oahe Formation names have been applied to unlithified glacial sediments across North Dakota. The Coleharbor Formation has produced fossil remains of plants, mollusks, insects, amphibians, and mammals (e.g., horses, bison, and giant ground sloth) and is rated Class 3 (moderate) under the PFYC system. The Oahe Formation is thought to be largely wind-blown, and therefore, has a lower fossil potential and is rated Class 2 (low) under the PFYC system.

3.5 Hazardous Materials and Wastes and Solid Waste

Hazardous materials are defined by 49 CFR § 171.8 as “hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (49 CFR § 172.101), and materials that meet the defining criteria for hazard classes and divisions” in 49 CFR § 173. Transportation of hazardous materials is regulated by the U.S. Department of Transportation regulations within 49 CFR § 105–180.



Hazardous wastes are defined by the Resource Conservation and Recovery Act at 42 U.S.C. § 6903(5), as amended by the Hazardous and Solid Waste Amendments, as: “a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.” Certain types of hazardous wastes are subject to special management provisions intended to ease the management burden and facilitate the recycling of such materials. These are called universal wastes and their associated regulatory requirements are specified in 40 CFR § 273. Special hazards are those substances that might pose a risk to human health and are addressed separately from other hazardous substances.

Solid waste management primarily relates to the availability of landfills to support a population’s residential, commercial, and industrial needs.

The Falkirk Mine is a surface lignite mining operation in which there are no surface activities that generate hazardous wastes. Non-coal wastes associated with mining operations such as trees, brush, inert waste from inspected farmsteads, wood materials (e.g., pallets, lumber, lathe, cable spools, and fence posts), brick, concrete block, cured concrete, plastic materials, and pipe are stored in a controlled manner in a designated and approved portion of the area permitted for mining. Disposal of the non-coal wastes (in the years following the resumption of mining) occurs in approved mine pits on land under the Falkirk Mine ownership.

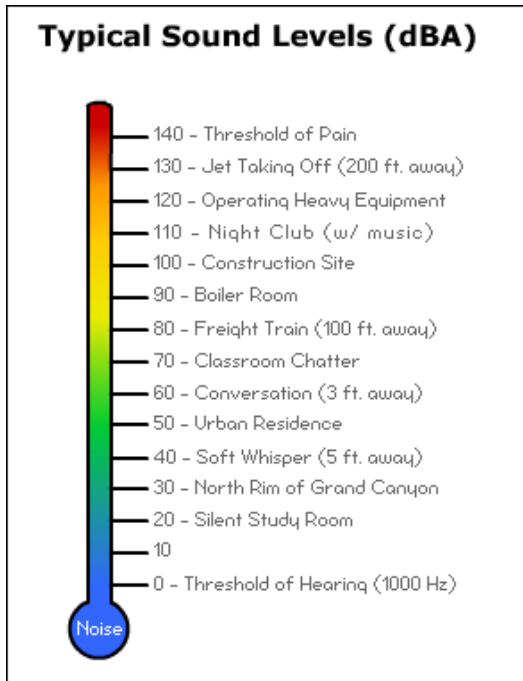
3.6 Noise

Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. Human response to increased sound levels varies according to the source type, characteristics of the sound source, distance between source and receptor, receptor sensitivity, and time of day. Affected receptors are specific (e.g., schools, churches, or hospitals) or broad (e.g., nature preserves or designated districts) areas in which occasional or persistent sensitivity to noise above ambient levels exists.

Although human response to noise varies, measurements can be calculated with instruments that record instantaneous sound levels in decibels. A-weighted decibels (dBA) are used to characterize sound levels that can be sensed by the human ear. A soft whisper from 5 feet away is normally 40 dBA and considered to be very quiet, while classroom chatter is considered an intrusive noise at 70 dBA. Noise levels can become annoying at 80 dBA and very annoying at 90 dBA. To the human ear, each 10 dBA increase seems twice as loud (EPA 1981). Please refer to **Figure 6, Typical Sound Levels**.

Under the Noise Control Act of 1972, the Occupational Safety and Health Administration (OSHA) established workplace standards for noise. The minimum requirement states that constant noise exposure must not exceed 90 dBA over an 8-hour period. The highest allowable sound level to which workers can be constantly exposed is 115 dBA, and exposure to this level must not exceed 15 minutes within an 8-hour period. The standards limit instantaneous exposure, such as impact noise, to 140 dBA. If noise levels exceed these standards, employers are required to provide hearing protection equipment that will reduce sound levels to acceptable limits (29 CFR § 1910.95).





Source: DOL 2013

Figure 6, Typical Sound Levels

Noise currently generated within, and surrounding the area of, the section 10 lease tract is from local vehicle traffic, agriculture equipment, and nearby operating mining equipment. Noise measurements obtained by OSHA determined that the median noise level for mining is approximately 88.04 dbA (DOL 2013). According to the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations, there are no public buildings or sensitive noise receptors located within 300 feet of a pit operation.

An occupied farmhouse, located in the southwestern corner of the section 10 lease tract, is the nearest sensitive noise receptor to the lease tract. To date, the Falkirk Mine is in negotiations to purchase this property. Other sensitive noise receptors include a few scattered farm houses, located approximately 1 mile northeast; several residences, located approximately 1.5 miles southwest in the City of Underwood; and two churches and one school, located approximately 1.9 miles southwest of the lease tract.

3.7 Prime and Unique Farmlands

Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses. The soil qualities, growing season, and moisture supply are needed for a well-managed soil to produce a sustained high yield of crops in an economic manner. The land could be cropland, pasture, rangeland, or other land, but not urban built-up land or water. Unique farmland is defined as land that is used for protection of specific high-value food, feed, and forage crops. Farmland of statewide or local importance can be classified as nearly prime, and designated by law or an agency to be important.

Prime farmland, unique farmland, and farmland of statewide or local importance are provided protection by the Farmland Protection Policy Act (FPPA) of 1981 (7 U.S.C. 4201 et seq.). The FPPA applies to projects undertaken by, or with the assistance of, a Federal agency. The intent of the FPPA is to minimize the extent that Federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses. The Act also ensures that Federal programs are administered in a manner that, to the extent practicable, will be compatible with private, state, and local government programs and policies to protect farmland. The implementing procedures of the FPPA and Natural Resources Conservation Service (NRCS) require Federal agencies to evaluate the adverse impacts (direct and indirect) of their activities on prime and unique farmland, as well as farmland of statewide and local importance, and to consider alternative actions that could avoid adverse impacts. The NRCS is responsible for overseeing compliance with the FPPA and has developed the rules and regulations for implementation of the Act. Determination of whether an area is considered prime or unique farmland and potential impacts associated with a proposed action, is based on preparation of Form AD-1006, Farmland Conversion Impact Rating Form, for areas where prime farmland soils occur and by applying the following criteria established in Section 658.5 of the FPPA (7 CFR Part 658):

- ◆ Land Evaluation Criterion – Relative Value: This criterion is based on information from several sources including national cooperative soil surveys or other acceptable soil surveys, NRCS field office technical guides, soil potential ratings or soil productivity ratings, land capability classifications, and important farmland determinations. Based on this information, groups of soils within a local government’s jurisdiction will be evaluated and assigned a score between 0 and 100, representing the relative value for agricultural production of the farmland to be converted by the project, compared to other farmland in the same local government jurisdiction. This score will be the Relative Value Rating on Form AD-1006.
- ◆ Site Assessment Criteria: Federal agencies are to use the following criteria to assess the suitability of each proposed site or design alternative for protection as farmland along with the score from the land evaluation criterion. Each criterion will be given a score on a scale of 0 to the maximum points shown. Conditions suggesting top, intermediate, and bottom scores are indicated for each criterion. The agency would make scoring decisions in the context of each proposed site or alternative action by examining the site, surrounding area, and programs and policies of the state or local unit of government in which the site is located. Where one given location has more than one design alternative, each design should be considered as an alternative site. The site assessment criteria are as follows:
 - How much land is in nonurban use within a radius of 1 mile from where the project is intended?
 - How much of the perimeter of the site borders on land in nonurban use?
 - How much of the site has been farmed (managed for a scheduled harvest or timber activity) more than 5 of the last 10 years?
 - Is the site subject to State or unit of local government policies or programs to protect farmland or covered by private programs to protect farmland?
 - How close is the site to an urban built-up area?
 - How close is the site to water lines, sewer lines and/or other local facilities and services whose capacities and design would promote nonagricultural use?



- Is the farm unit(s) containing the site (before the project) as large as the average-size farming unit in the county?
- If this site is chosen for the project, how much of the remaining land on the farm will become non-farmable because of interference with land patterns?
- Does the site have available adequate supply of farm support services and markets (i.e., farm suppliers, equipment dealers, processing and storage facilities, and farmer's markets)?
- Does the site have substantial and well-maintained on-farm investments such as barns, other storage buildings, fruit trees and vines, field terraces, drainage, irrigation, waterways, or other soil and water conservation measures?
- Would the project at this site, by converting farmland to nonagricultural use, reduce the demand for farm support services so as to jeopardize the continued existence of these support services and thus, the viability of the farms remaining in the area?
- Is the kind and intensity of the proposed use of the site sufficiently incompatible with agriculture that it is likely to contribute to the eventual conversion of surrounding farmland to nonagricultural use?

- ◆ **Corridor-type Site Assessment Criteria:** This criteria is to be used for projects that have a linear or corridor-type site configuration, connecting two distant points and crossing several different tracts of land. These include utility lines, highways, railroads, stream improvements, and flood control systems. Federal agencies are to assess the suitability of each corridor-type site or design alternative for protection as farmland along with the land evaluation information described in CFR § 658.4(a).

There are approximately 170 acres of farmland of statewide importance within the section 10 lease tract. Please refer to **Figure 7, Section 10 Lease Tract Farmland**. Of the seven soils mapped in the lease tract, three are considered to be farmland of statewide importance soils (Williams-Zahl loams, Williams-Falkirk loams, and Williams-Bowbells loams). The Williams soil series consists of deep, nearly level to gently rolling, well-drained soils that are formed in loamy glacial till. The Zahl soil series consists of deep, nearly level to steep, well-drained soils that are formed in loamy glacial till. The Falkirk soil series consists of deep, nearly level to gently rolling, well-drained soils that are formed in a loam melt-water mantle, ranging from 20 to 40 inches thick over loamy glacial till. The Bowbells soil series consists of deep, nearly level to gently rolling, moderately well-drained soils that are formed in glacial till (USDA 1979).

3.8 Socioeconomics and Environmental Justice

Accurately portraying the socioeconomics of the geographic region is essential to understanding the possible impacts of a proposed action. For the purposes of this analysis, three geographic areas will be discussed in greater detail, including McLean, Mercer, and Oliver counties. The mine's physical location implies that McLean County will be the primary geographic region of interest. Because the Falkirk Mine might pull labor from neighboring counties, while contributing to indirect employment and income through proximity, Mercer and Oliver counties will also be discussed. The overall impacts from the Proposed Action and No Action Alternative on socioeconomic resources in the State of North Dakota will also be analyzed.



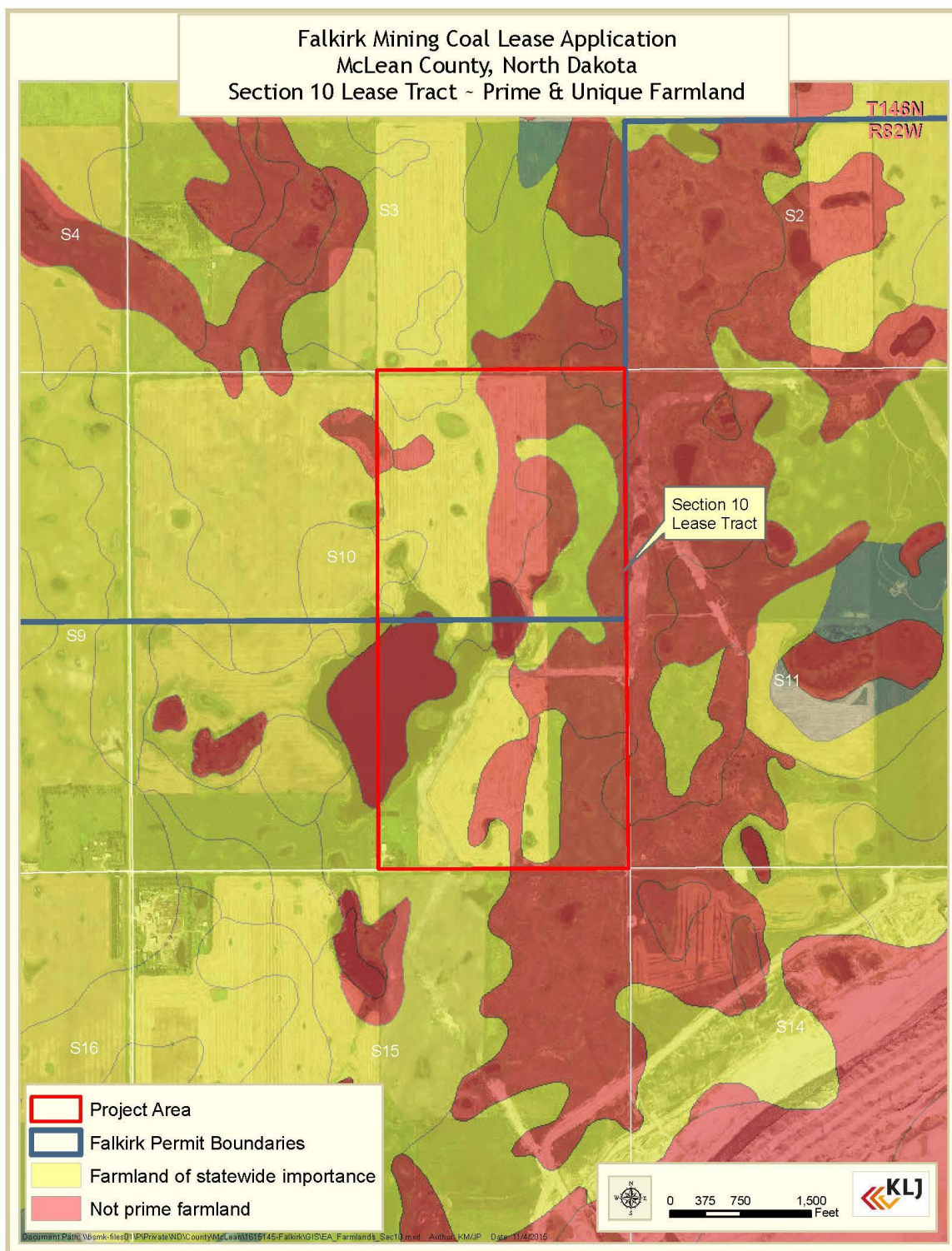


Figure 7, Section 10 Lease Tract Farmland

3.8.1 Demographics

Over the last 15 years, the State of North Dakota has seen an overall population growth. The population in North Dakota increased approximately 4.7 percent between 2000 and 2010, from 642,200 to 672,591. However, between 2000 and 2010, the populations of McLean, Mercer, and Oliver counties declined approximately 3.8, 2.6, and 10.6 percent, respectively (Census Bureau 2000, Census Bureau 2010). Between 2010 and 2014, the population of North Dakota increased approximately 9.9 percent, from 672,591 to 739,482 people. The populations of McLean, Mercer, and Oliver counties also increased between 2010 and 2014, approximately 6.9, 3.8, and 0.2 percent, respectively (Census Bureau 2014). Table 5 summarizes the population estimates in 2000 and between 2010 and 2014 for the State of North Dakota and McLean, Mercer, and Oliver counties. Please refer to **Table 6, Population Estimates (2000, 2010-2014)**.

Housing data for 2015 are not yet available for North Dakota or McLean, Mercer, or Oliver counties; therefore, data from the U.S. Census Bureau 2009-2013 American Community Survey (ACS) 5-Year Estimates (hereafter referred to as the 2009-2013 ACS Survey) are being used. Vacant housing units in the State of North Dakota were estimated at approximately 37,442 or 11.5 percent of all housing units. Vacant housing units in McLean, Mercer, and Oliver counties were estimated at approximately 1,631, 876, and 159, respectively (Census Bureau 2009-2013a). Table 6 summarizes the vacant housing data for the State of North Dakota and McLean, Mercer, and Oliver counties, as estimated in the 2009-2013 ACS Survey. Please refer to **Table 7, Vacant Housing Units**.

A farmhouse is located in the southwestern corner of the section 10 lease tract. To date, the Falkirk Mine is in negotiations to purchase this property.

Table 6, Population Estimates (2000, 2010-2014)

LOCATION	2000	2010	2011	2012	2013	2014
State of North Dakota	642,200	672,591	685,242	701,705	723,857	739,482
McLean County	9,311	8,962	9,081	9,371	9,476	9,578
Mercer County	8,644	8,424	8,419	8,486	8,596	8,746
Oliver County	2,065	1,846	1,845	1,832	1,869	1,850

Sources: Census Bureau 2000, Census Bureau 2010, Census Bureau 2014



Table 7, Vacant Housing Units

LOCATION*	TOTAL UNITS	VACANT UNITS	PERCENTAGE VACANT
State of North Dakota	324,712	37,442	11.5
McLean County	5,652	1,631	28.9
Mercer County	4,526	876	19.4
Oliver County	912	159	17.4

Source: Census Bureau 2009-2013a

Note: * Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a 90 percent margin of error. In addition to sampling variability, the 2009-2013 ACS Survey estimates are subject to nonsampling error, which is not represented in these tables.

3.8.2 Employment Characteristics

Employment data for 2015 are not yet available for North Dakota or McLean, Mercer, or Oliver counties; therefore, data from the U.S. Department of Commerce, Bureau of Economic Analysis 2014 estimates are being used to summarize the labor force in the State of North Dakota and McLean, Mercer, and Oliver counties.

In 2014, there was an estimated 600,923 jobs in the State of North Dakota. In McLean, Mercer, and Oliver counties there were 5,791, 6,941, and 1,606 jobs, respectively. In the State of North Dakota, the three largest industries were State and Local Government and Government Enterprises, Health Care and Social Assistance, and Construction. In McLean County, the three largest industries were Farming, State and Local Government and Government Enterprises, and Construction. In Mercer County, the three largest industries were Utilities, Construction, and Retail Trade. For Oliver County, there was a tie for the third largest industry; therefore, the four largest industries are reported in this EA. They were Farming; Construction; Real Estate, Rental, and Leasing; and State and Local Government and Government Enterprises (BEA 2014a, BEA 2014b). A summary of employment data for the major industries in the State of North Dakota and McLean, Mercer, and Oliver counties are displayed in Table 7. Please refer to **Table 8, Employment by Major Industries**.

The average annual unemployment data for 2015 are not yet available for North Dakota or McLean, Mercer, or Oliver counties; therefore, the average annual unemployment data for 2014 from the U.S. Department of Labor, Bureau of Labor Statistics are being used in this EA. The average numbers of unemployed individuals in the State of North Dakota and McLean, Mercer, and Oliver counties in 2014 were approximately 11,503, 204, 170, and 57 people, respectively (BLS 2014a, BLS, 2014b, BLS 2014c, BLS 2014d).



Table 8, Employment by Major Industries

OCCUPATION	STATE OF NORTH DAKOTA ^(a)	MCLEAN COUNTY ^(b)	MERCER COUNTY ^(c)	OLIVER COUNTY ^(d)
Accommodation and Food Services	38,724 (6.44 percent)	261 (4.51 percent)	317 (4.57 percent)	29 (1.81 percent)
Administrative and Waste Management Services	19,339 (3.22 percent)	N/A ^(e)	134 (1.93 percent)	N/A ^(e)
Arts, Entertainment, and Recreation	7,768 (1.29 percent)	58 (1.00 percent)	66 (0.95 percent)	34 (2.12 percent)
Construction	45,213 (7.52 percent)	423 (7.30 percent)	772 (11.12 percent)	105 (6.54 percent)
Education Services	6,342 (1.06 percent)	N/A ^(e)	N/A ^(e)	N/A ^(e)
Farming	33,814 (5.63 percent)	927 (16.01 percent)	425 (6.12 percent)	301 (18.74 percent)
Federal, Civilian Government and Government Enterprises	9,104 (1.52 percent)	125 (2.16 percent)	39 (0.56 percent)	N/A ^(f)
Forestry, Fishing, and Related Activities	4,661 (0.78 percent)	N/A ^(e)	N/A ^(e)	N/A ^(e)
Health Care and Social Assistance	63,257 (10.53 percent)	N/A ^(e)	N/A ^(e)	N/A ^(e)
Management of Companies and Enterprises	5,575 (0.93 percent)	N/A ^(e)	N/A ^(f)	N/A ^(f)
Manufacturing	27,573 (4.59 percent)	84 (1.45 percent)	68 (0.98 percent)	38 (2.37 percent)
Military Government and Government Enterprises	11,615 (1.93 percent)	63 (1.09 percent)	58 (0.84 percent)	12 (0.75 percent)
Mining	34,608 (5.76 percent)	N/A ^(e)	N/A ^(e)	N/A ^(e)
Other Services, Except Public Administration	27,354 (4.55 percent)	N/A ^(e)	254 (3.66 percent)	N/A ^(e)
Professional, Scientific, and Technical Services	23,543 (3.92 percent)	N/A ^(e)	144 (2.07 percent)	N/A ^(e)
Real Estate, Rental, and Leasing	17,610 (2.93 percent)	106 (1.83 percent)	142 (2.05 percent)	103 (6.41 percent)
Retail Trade	Not Reported	400 (6.91 percent)	565 (8.14 percent)	N/A ^(e)
State and Local Government and Government Enterprises	66,852 (11.12 percent)	716 (12.36 percent)	545 (7.85 percent)	N/A ^(f)
Utilities	3,790 (0.63 percent)	N/A ^(e)	1,324 (19.08 percent)	N/A ^(e)

Sources: BEA 2014a, BEA 2014b

Notes:

- The approximate percentages of jobs within each occupation were calculated from the total jobs in the State of North Dakota (600,923 people).
- The approximate percentages of jobs within each occupation were calculated from the total jobs in McLean County (5,791 people).
- The approximate percentages of jobs within each occupation were calculated from the total jobs in Mercer County (6,941 people).
- The approximate percentages of jobs within each occupation were calculated from the total jobs in Oliver County (1,606 people).
- Not Available: Estimates are not shown to avoid disclosure of confidential information; however, the estimates for this industry are included in the total estimated jobs for the county (BEA 2014b).



- f. This industry has less than 10 people employed; however, the estimates for this industry are included in the total estimated jobs for the county (BEA 2014b).

3.8.3 Environmental Justice and Protection of Children

Environmental Justice is defined by EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. EO 12898 pertains to environmental justice issues and relates to various socioeconomic groups and the health effects that could be imposed on them. Consideration of environmental justice concerns includes races, ethnicity, and the poverty status of populations in the vicinity of a proposed project. Such information aids in evaluating whether a proposed project would render vulnerable any of the groups targeted for protection in the EO.

Minority populations, as defined by Council on Environmental Quality (CEQ) guidance under NEPA (40 CFR § 1500–1508), include individuals in the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. Minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. A minority population also exists if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the previously stated thresholds.

Low-income populations are determined by the U.S. Census Bureau based on poverty thresholds developed each year. Data from the U.S. Census is used to determine whether the populations residing in the study area constitute an “environmental justice population” through meeting either: (a) at least one-half of the population is of minority or low-income status or (b) the percentage of the population that is of minority or low-income status is at least 10 percentage points higher than the entire State of North Dakota.

CEQ guidance does not provide specific criteria for determining low-income populations as it does for minority populations. Therefore, for purposes of this analysis, the criteria for minority populations, which are previously discussed, will be used as the criteria for low-income populations. Low-income and minority population percentages that are “meaningfully greater” are at least 10 percentage points higher than the entire State of North Dakota.

EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, states that each Federal agency “(a) shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and (b) shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.”

Race, ethnicity, and poverty characteristics data for 2015 are not yet available for North Dakota or McLean, Mercer, or Oliver counties; therefore, data from the 2009-2013 ACS Survey are being used. In the State of North Dakota, 89.6 percent of the population was estimated to be White, 5.3 percent was estimated to be American Indian and Alaska Native, 2.3 percent was estimated to be Hispanic, 1.3 percent was estimated to be Black or African American, 1.1 percent was estimated to be Asian, and 0.7 percent was estimated to be some other race. In McLean County, 91.6 percent of the population was



estimated to be White, 7.4 percent was estimated to be American Indian and Alaska Native, 1.6 percent was estimated to be Hispanic, and 0.1 percent was estimated to be Asian. In Mercer County, 95.7 percent of the population was estimated to be White, 2.2 percent was estimated to be American Indian and Alaska Native, 1.7 percent was estimated to be Hispanic, 0.9 percent was estimated to be Black or African American, 0.3 percent was estimated to be Asian, and 0.2 percent was estimated to be some other race. In Oliver County, 95.9 percent of the population was estimated to be White, 2.3 percent was estimated to be American Indian and Alaska Native, 2.0 percent was estimated to be Hispanic, 0.6 percent was estimated to be some other race, and 0.1 percent was estimated to be Asian (Census Bureau 2009-2013d). Of the races, the White population had the highest estimated percentages for North Dakota and McLean, Mercer, and Oliver counties. It was estimated that less than 11 percent of the population of North Dakota, 9 percent of McLean County, 5 percent of Mercer County, and 5 percent of Oliver County were within a racial minority (i.e., race other than White alone). In the State of North Dakota, approximately 11.9 percent of the population was estimated to be below the poverty level. In McLean, Mercer, and Oliver counties, approximately 10.9, 7.3, and 7.4 percent, respectively, were estimated to be below the poverty level (Census Bureau 2009-2013c). Please refer to **Table 9, Race, Ethnicity, and Poverty Characteristics**.

Median household income data for 2015 are not yet available for North Dakota or McLean, Mercer, or Oliver counties; therefore, data from the 2009-2013 ACS Survey are being used. The median household incomes for the State of North Dakota and McLean County were estimated at \$32,313 and \$33,589, respectively, which are similar to the median household income estimated in the United States (\$33,419). The median household income for Mercer County was estimated at \$37,990, which was slightly higher than North Dakota and McLean County. Oliver County was estimated to have the highest median household income for the areas studied (\$41,875) (Census Bureau 2009-2013b). The State of North Dakota and McLean, Mercer, and Oliver counties all had lower estimated percentages of individuals living below poverty than the United States (15.4 percent). Of the areas studied, the State of North Dakota had the highest estimated percentage of individuals living below poverty (11.9 percent) and Mercer County had the lowest (estimated at 7.3 percent). The estimated percentage of the total population who were children (i.e., individuals under 18 years of age) living in North Dakota was approximately 22.3 percent. This is similar to the estimated percentage of the total population who were children residing in McLean, Mercer, and Oliver counties (20.1, 21.4, and 23.4 percent, respectively) (Census Bureau 2009-2013c). Please refer to **Table 8, Race, Ethnicity, and Poverty Characteristics**.



Table 9, Race, Ethnicity, and Poverty Characteristics

RACE AND ETHNICITY ^(a)	STATE OF NORTH DAKOTA	MCLEAN COUNTY	MERCER COUNTY	OLIVER COUNTY
Population	723,857	9,476	8,596	1,869
Percent Under 18 Years of Age	22.3	20.1	21.4	23.4
Percent 65 Years of Age and over	14.4	21.5	16.6	19
Percent White	89.6	91.6	95.7	95.9
Percent Black or African American	1.3	0	0.9	0
Percent American Indian and Alaska Native	5.3	7.4	2.2	2.3
Percent Asian	1.1	0.1	0.3	0.1
Percent Other Race	0.7	0	0.2	0.6
Percent Two or More Races	2.0	0.9	0.8	1.1
Percent Hispanic or Latino ^(b)	2.3	1.6	1.7	2.0
Median Household Income	32,313	33,589	37,990	41,875
Percent of Individuals Living Below Poverty	11.9	10.9	7.3	7.4

Sources: Census Bureau 2009-2013b, Census Bureau 2009-2013c, Census Bureau 2009-2013d

Notes:

- Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a 90 percent margin of error. In addition to sampling variability, the 2009-2013 ACS Survey estimates are subject to nonsampling error, which is not represented in these tables.
- A person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race. The term, "Spanish origin," can be used in addition to "Hispanic or Latino."

3.9 Soils

Soils are the unconsolidated materials overlying bedrock or other parent material. Soils typically are described in terms of their complex type, slope, and physical characteristics. Differences among soil types in terms of their structure, elasticity, strength, shrink-swell potential, and erosion potential affect their abilities to support certain applications or uses.

The 1979 U.S. Department of Agriculture (USDA) Soil Survey of McLean County and USDA/NRCS Web Soil Survey identified seven soil types within the section 10 lease tract. Soils within the section 10 lease tract include Williams-Zahl-Zahill (21.8 percent, approximately 72.2 acres), Zahl-Williams loams (18.3 percent, approximately 60.6 acres), Williams-Zahl loams (17.8 percent, approximately 59 acres), Williams-Bowbells loams (17.6 percent, approximately 58.2 acres), Williams-Falkirk loams (16.3 percent, approximately 54.2 acres), Southam silty clay loam (6.1 percent, approximately 20.3 acres), and Parnell silty clay loam (2.2 percent, approximately 7.1 acres) (USDA 1979, USDA/NRCS 2015). Characteristics of these soils are summarized in Table 9. Please refer to **Table 10, Characteristics of Soils in the Section 10 Lease Tract**.



Table 10, Characteristics of Soils in the Section 10 Lease Tract

MAP UNIT SYMBOL	SOIL NAME	PERCENT SLOPE	COMPOSITION			EROSION FACTOR ^(a)		HYDROLOGIC SOIL GROUP ^(b)
			SAND (PERCENT)	SILT (PERCENT)	CLAY (PERCENT)	T	KF	
C3A	Parnell silty clay loam	0 to 1	12.4	47.9	39.7	5	0.37	C/D
C5A	Southam silty clay loam	0 to 1	10.3	49.4	40.2	5	0.32	C/D
C132B	Williams-Zahl loams	3 to 6	33.6	38.1	28.3	5	0.37	C
C132C	Williams-Zahl-Zahill complex	6 to 9	33.6	38.1	28.3	5	0.37	C
C135D	Zahl-Williams loams	9 to 15	33.2	39.0	27.8	5	0.37	C
C164B	Williams-Falkirk loams	3 to 6	34.8	35.2	30.0	5	0.32	C
C210A	Williams-Bowbells loams	0 to 3	33.6	38.1	28.3	5	0.37	C
C210B	Williams-Bowbells loams	3 to 6	33.6	38.1	28.3	5	0.37	C

Sources: USDA 1979, USDA/NRCS 2015

Key:

T = Factors that estimate maximum average annual rates of erosion by wind and water that will not affect crop productivity. Values range from 1 for shallow soils to 5 for very deep soils. Soils with higher T values can tolerate higher rates of erosion without loss of productivity.

Kf = The erodibility of material less than 2 millimeters in size. Values range from 0.02 to 0.69. Soils with higher Kf values indicate greater susceptibility to erosion.

C = Hydrologic Soil Group with a moderate to low infiltration rate and moderate runoff.

D = Hydrologic Soil Group with a low infiltration rate and high runoff.

Notes:

- Erosion factors indicate susceptibility of a soil to sheet and rill erosion by water.
- Hydrologic Soil Groups are based on estimates of runoff potential according to the rate of water infiltration under the following conditions: soils are not protected by vegetation, soils are thoroughly wet, and soils receive precipitation from long-duration storms.

As shown in the table, the identified soils have a moderate susceptibility to sheet and rill erosion and can tolerate higher rates of erosion without loss of productivity. In addition, the identified soils have a low to moderate infiltration rate and a moderate to high runoff rate.

3.10 Threatened, Endangered, Proposed, and Candidate Species

Protected and sensitive biological resources include federally listed (endangered or threatened), proposed, and candidate species designated by the USFWS. An endangered species is one that is in danger of extinction throughout all or a significant portion of its range, while a threatened species is one that is likely to become endangered in the foreseeable future. A proposed species is one that is officially proposed in the Federal Register to be listed under Section 4 of the Endangered Species Act (ESA). A candidate species is a plant or animal for which the USFWS has sufficient information on its biological status and threats to propose it as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher priority listing activities. While candidate species are not legally protected under the ESA, it is within the spirit of the ESA to consider said species as having significant value and worth protecting. Federal species of concern are



not protected by law; however, these species could become listed, and therefore are given consideration when addressing biological resource impacts of an action.

Sensitive habitats include those areas designated by the USFWS as Critical Habitat protected by the ESA and sensitive ecological areas as designated by state or Federal rulings. Critical Habitat includes specific areas that are occupied by a species at the time of listing or unoccupied areas that are considered essential to the conservation and/or recovery of a species. Sensitive habitats also include wetlands, plant communities that are unusual or of limited distribution, and important seasonal use areas for wildlife (e.g., migration routes, breeding areas, crucial summer and winter habitats). In accordance with Section 7 of the ESA, each Federal agency is required to ensure the following two criteria: (1) any action funded or carried out by such agency must not be likely to jeopardize the continued existence of any federally listed endangered or threatened species or species proposed to be listed and (2) no such action can result in the destruction or adverse modification of habitat of such species that is determined to be critical by the Secretary of the Interior.

According to the USFWS Species by County Report for McLean County, there are three endangered species (whooping crane [*Grus americana*], least tern [*Sterna antillarum*], and pallid sturgeon [*Scaphirhynchus albus*]), four threatened species (piping plover [*Charadrius melodus*], red knot [*Calidris canutus rufa*], Dakota skipper [*Hesperia dacotae*], and Northern long-eared bat [*Myotis septentrionalis*]), and one candidate species (Sprague's pipit [*Anthus spragueii*]) (USFWS Undated). As of April 4, 2016, the USFWS determined that the Sprague's pipit no longer meets the definition of a candidate species under the ESA. The USFWS found that the habitat loss from agriculture in the Sprague's pipit's key breeding grounds does not pose a significant risk, historic rates of population decline are expected to stabilize, and the Sprague's pipit is not as affected as once thought by energy development and connecting roads. Studies also show that Sprague's pipits are more mobile, adaptable, and found in more areas than expected in wintering habitat. Therefore, the Sprague's pipit is not discussed in further detail in this EA. The gray wolf (*Canis lupus*) is an endangered species that was not listed on the USFWS Species by County Report for McLean County, as this species is uncommon in North Dakota. However, individual wolves occasionally pass through the state; therefore, it is discussed further in detail in the following subsections. None of the endangered or threatened species were observed during the fish and wildlife field surveys conducted for the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations.

Some of the information in the following subsections was obtained from the Falkirk Mine Fish and Wildlife Management Plan, which is in Section 2-4 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. Please refer to **Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations**.

Whooping Crane

The whooping crane breeds, migrates, winters, and forages in a variety of wetland and other habitats, including coastal marshes and estuaries, inland marshes, lakes, ponds, wet meadows and rivers, and agricultural fields. Whooping cranes breed and nest in wetland habitat, where bulrush is the dominant vegetation type; however, cattail, sedge, musk-grass, and other aquatic plants are also common. The whooping crane is a bi-annual migrant that travels from its summer habitat in central Canada across the Great Plains of the United States to its wintering grounds on the Texas coast. During migration, whooping cranes use a variety of habitats; however, wetland mosaics appear to be the most suitable.



For feeding, whooping cranes primarily use shallow, seasonally and semi-permanently flooded palustrine wetlands for roosting, and various cropland and emergent wetlands. Palustrine wetlands include all nontidal wetlands dominated by trees, shrubs, emergent, mosses, or lichens (USFWS 2015b).

It has been well documented that whooping cranes will alter their landing and flight patterns to avoid areas of human disturbance including roadways, buildings, and structures. Studies have shown whooping crane roost sites to have varying mean distances to roadways, ranging from 2,021 to 3,839 feet (Johns et al. 1997, Ward and Anderson 1987). Whooping cranes have also been shown to avoid roosting near human-made structures. Mean documented avoidance distances range from 2,343 feet during the spring migration to 3,402 feet during the fall migration, with respect to structures and buildings (Johns et al. 1997).

Based on these findings, and for the purposes of this analysis, it has been assumed that whooping cranes would avoid using habitat within 2,021 feet of existing roadways and 2,343 feet of existing structures and buildings. The USFWS National Wetlands Inventory mapped 29 palustrine emergent wetlands within the section 10 lease tract that are seasonally flooded. Surface water is present in these wetlands for extended periods (especially early in the growing season) but absent by the end of the growing season in most years (USFWS 2015a). Cropland is located within 1 mile of the section 10 lease tract. In addition, the section 10 lease tract is located in the Central Flyway, where 75 percent of confirmed whooping crane sightings have occurred (USFWS 2010). According to the Falkirk Mine Fish and Wildlife Management Plan, cropland habitat represents the predominant agricultural or human-made habitat present in the area, and the cropland is generally considered to be of only minimal value to the area wildlife, due to such intensive agricultural management practices. In general, the most value of the cropland habitats to wildlife is that of providing a seasonal source of food to animals inhabiting adjacent habitats and to migratory waterfowl and shorebirds.

Least Tern

In North Dakota, the least tern uses sparsely vegetated sandbars on the Missouri River and can be found from the Garrison Dam south to Lake Oahe. Birds nest, raise young, and relax on the barren river sandbars. Approximately 100 pairs breed in North Dakota (USFWS 2013, USFWS 2015c). According to the USACE Missouri River Recovery Least Tern and Piping Plover Data Management System, historical interior least tern sightings have occurred along the shoreline of the Missouri River and Lake Sakakawea. The Missouri River and Lake Sakakawea are approximately 15.3 miles west and 39.2 miles north-northwest of the section 10 lease tract, respectively. No potential habitat for the least tern exists within the section 10 lease tract.

Pallid Sturgeon

Pallid sturgeon are a bottom-oriented, large river obligate fish that inhabits the Missouri and Mississippi rivers and some tributaries from Montana to Louisiana. The species is typically found in areas where relative depths (i.e., the depth at the fish location divided by the maximum channel cross section depth expressed as a percent) exceed 75 percent. Spawning occurs between March and July, with lower latitude fish spawning occurring earlier than those in the northern portion of the range. Adult pallid sturgeon can move long distances upstream prior to spawning, and females likely spawn at or near the apex of these movements. Spawning occurs over firm substrates, in deeper water, with relatively fast, turbulent flows, and is driven by several environmental stimuli including flow, water temperature, and day length (USFWS 2015d). The Missouri River is approximately 15.3 miles west of



the section 10 lease tract. Potential habitat for the pallid sturgeon exists in Lake Sakakawea. Lake Sakakawea is approximately 39.2 miles north-northwest of the section 10 lease tract. No potential habitat occurs within the section 10 lease tract.

Piping Plover

In western North Dakota, suitable habitat for the piping plover occurs along the Missouri and Yellowstone rivers in the form of riverine sandbars, gravel beaches, and flat sandy beaches containing sparse vegetation. Suitable habitat also consists of alkali areas of wetlands, which occur throughout North Dakota. According to the USACE Missouri River Recovery Least Tern and Piping Plover Data Management System, historical piping plover sightings have occurred along the shoreline of Lake Sakakawea. Critical Habitat for the Northern Great Plains population of piping plovers has been designated on alkali lakes and wetlands and Yellowstone and Missouri Rivers in North Dakota (USFWS 2015e). The Missouri River and Lake Sakakawea are approximately 15.3 miles west and 39.2 miles north-northwest of the section 10 lease tract, respectively. No suitable or potential habitat or Critical Habitat occurs within the section 10 lease tract.

Red Knot

The red knot migrates during the spring and fall between breeding grounds in northern Canada and wintering grounds in the southeastern United States, northeastern Gulf of Mexico, northern Brazil, and Tierra del Fuego in South America. While a majority of red knots follow migration routes along the east and west coasts of the United States, small numbers of this species follow an inland migration route across the Midwest, along the Great Lakes. Preferred stopover habitat in North America includes sandy or gravelly beaches, tidal mudflats, salt marshes, shallow coastal impoundments, and peat banks. Preferred prey found in nonbreeding habitats includes snails, mollusks, and insect larvae (USFWS 2015f). There have been no documented sightings of the red knot within the section 10 lease tract, as habitat is lacking. Potential habitat exists along the Missouri River, Lake Audubon, and Lake Sakakawea; however, no suitable habitat for the red knot occurs within the section 10 lease tract. The Missouri River, Lake Audubon, and Lake Sakakawea are approximately 15.3 miles west, 5.1 miles north, and 39.2 miles north-northwest of the section 10 lease tract, respectively.

Dakota Skipper

The Dakota skipper is presumed to have historically ranged from southern Saskatchewan across North Dakota, South Dakota, and Minnesota, and potentially into Iowa and Illinois. It is now considered extirpated from Iowa and Illinois and occurs in fragmented portions of this range in Minnesota, North Dakota, South Dakota, Manitoba, and Saskatchewan. Preferred habitat includes two grassland types: low (wet) grassland dominated by bluestem grasses (*Andropogon* and *Schizachyrium* spp.), wood lily (*Lilium philadelphicum*), harebell (*Campanula rotundifolia*), and smooth camas (*Zigadenus elegans*); and upland (dry) grassland on ridges and hillsides dominated by bluestem, needles grasses (*Stipa* spp.), pale purple coneflower (*Echinacea* spp.), upright coneflower (*Ratibida columnifera*), and blanket flower (*Gaillardia* spp.). Dakota skippers remain in the larvae stage throughout most of the year and are most visible during their adult flight stage, which occurs from mid-June to early July. Populations have declined due to widespread conversion of native grassland (USFWS 2015g).

Dakota skipper dispersal is limited due in part to a short adult life span and single annual flight. Maximum dispersal distance for the Dakota skipper is believed to be approximately 0.6 miles; therefore, areas containing suitable habitat are considered to be permanently extirpated unless



located near a site actively generating sufficient emigrants. Only a small fraction of the grassland in North Dakota has been surveyed for the Dakota skipper; however, it is thought that a significant portion of the un-surveyed land is not suitable for the Dakota skipper (USFWS 2015g). Critical Habitat for the Dakota skipper has been designated for 12 prairie units in North Dakota. The nearest Critical Habitat to the section 10 lease tract is Unit 5, along North Dakota Highway 14, in McHenry County, ND (USFWS 2015j). Unit 5 is approximately 54 miles northeast of the section 10 lease tract. There is no potential habitat for the Dakota skipper within the section 10 lease tract, as almost all of the land within the section 10 lease tract is devoted to agriculture and cultivated for the production of crops.

Northern Long-eared Bat

The Western population of northern long-eared bats occurs partially in North Dakota, where the bats have been observed during the summer in the Turtle Mountains, Missouri River Valley, and Badlands. No hibernacula (i.e., overwintering sites such as caves, abandoned mines, or similar constructions) are known to exist in North Dakota; however, this may be a function of lack of adequate survey data (78 *Federal Register* [FR] 191, October 2, 2013). Suitable habitat for summer maternity/nonmaternity activities and spring staging/fall swarming includes forests, woodlots, fence rows, riparian forests, and other wooded corridors. Density and canopy cover is variable within these forested habitats, which could be interspersed with wetlands, agricultural or fallow fields, or pastures. Potential roost sites include live trees or snags that are greater than or equal to 3 inches in diameter at breast height and can include exfoliating bark, cracks, crevices, or cavities. The species is known to switch roost trees about every two days over the course of the summer, and therefore, areas with a large number of trees are preferable (Foster and Kurta 1999). Isolated trees might be potential roost sites if they exhibit the characteristics previously described and are less than 1,000 feet from the nearest roosting site or suitable forested habitat (USFWS 2014, USFWS 2015h). There are no suitable or potential winter habitats within the section 10 lease tract. Sparsely vegetated shelterbelts are located within the section 10 lease tract that could provide suitable summer habitat for the northern long-eared bat.

Gray Wolf

The gray wolf is a keystone species (i.e., species that has a disproportionately large effect on its environment relative to its abundance) capable of surviving in a wide range of habitats including forests, mountains, and grasslands. Gray wolves dispersing through North Dakota west of the Missouri River and United States Highway 83 (US-83) remain classified as endangered. Historically, its preferred habitat includes biomes such as boreal forest, temperate deciduous forest, and temperate grassland (USFWS 2011, USFWS 2015i).

The section 10 lease tract does not contain significantly forested areas; however, tame grassland occurs within the section 10 lease tract. Potential habitat for the gray wolf could exist within these grassland areas; although, it is extremely limited and unlikely to be occupied. According to the Falkirk Mine Fish and Wildlife Management Plan, tame grassland consists of land used for long-term production of predominately adapted, domesticated species of forage plants to be grazed by livestock or occasionally cut and cured for livestock feed. The significance of tame grassland habitat to wildlife varies considerably depending on moisture, vegetation composition, and land management practices of a given area.



3.11 Transportation Resources

Transportation includes major and minor roadways (including haul roads) in the vicinity of a project area.

The section 10 lease tract is located approximately 1.2 miles northeast of US-83 and approximately 1 mile north of North Dakota Highway 200 (ND-200). County Highway 23 is approximately 0.7 miles west of the section 10 lease tract, and 4th Street NW and 5th Street NW are approximately 0.3 miles south and 0.7 miles north of the section 10 lease tract, respectively. Several smaller paved and unpaved roadways are also in the vicinity of the section 10 lease tract. Coal that is crushed is transported in haulage trucks to the Coal Creek Station. Haul roads and ancillary haul roads are located in the vicinity the section 10 lease tract to support mine traffic. The transportation Facilities Map in Section 3.5.2 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations shows the placement of the haul roads and displays the general location of ancillary haul roads. Haul Road Section 1 is the principal haul road in the vicinity of the section 10 lease tract. It extends north to the landfill access road. Haul Road Section 3 extends from the Haul Road Section 1 and landfill access road intersection north to ND-200, where a bridge (ND-200 Overpass) facilitates east-west highway traffic passing over the haul road. Temporary haul roads are located off Haul Road Section 3 to support mining and reclamation operations along the southern side of ND-200. Several other haul roads (e.g., Island Haul Road Section A, Island Haul Road Section B, Haul Road Section 6, Haul Road Section 7, Haul Road Section OB1a, and Haul Road Section OB1) are located in the vicinity of the section 10 lease tract to facilitate mine traffic. Please refer to ***Appendix B, Permit to Engage in Surface Coal Mining and Reclamation Operations***.

3.12 Vegetation

Field vegetation surveys, including types of vegetation, cover, and production, were conducted as part of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. In addition, land use types were noted during the field survey portion of the project kickoff meeting held on March 23, 2015. Land uses and vegetation characteristics are similar to the surrounding areas where cropland is intermixed with native and tame prairie rangelands. Land uses and vegetation patterns reflect local and regional economic conditions along with climatic, geologic, and soil factors. The section 10 lease tract contains a mixture of cropland, tame grassland, agriculturally developed land, shelterbelts, minor amounts of trees, and several freshwater emergent wetlands (i.e., palustrine emergent wetlands).

According to the 2013 North Dakota Department of Agriculture County and City Listed Noxious Weeds, 11 state noxious weeds are identified for the state. The noxious weed laws are enforced by all cities and counties in North Dakota. Counties and cities have the option to add additional weeds to a list for enforcement only in their jurisdiction. Of the 11 listed state noxious weeds, five are known to occur within McLean County (NDDA 2013).

3.13 Visual Resources

Visual resources are the natural and human-made features that give a particular setting or area its aesthetic qualities. These features define the landscape character of an area and form the overall impression that an observer receives of that area. Evaluating the aesthetic qualities of an area is a subjective process because the value that an observer places on a specific feature varies depending on



their perspective. In general, a feature observed within a landscape can be considered as “characteristic” (or character-defining) if it is inherent to the composition and function of the landscape.

The region of influence for visual resources associated with the section 10 lease tract consists of rural development characterized by rolling topography, farmland, rangeland, and homesteads. The section 10 lease tract is in McLean County, North Dakota; therefore, only this county is discussed further in detail.

All of the land in McLean County is considered rural, with a very low population density of approximately four people per square mile. Water bodies (i.e., lakes, streams, rivers, and creeks) in McLean County include Lake Audubon, Lake Sakakawea, Lake Nettie, Nelson Lake, Mud Lake, Postel Lake, Howells Lake, Minehan Slough, Lake Holmes, Lost Lake, the Missouri River, Buffalo Creek, Deepwater Creek, Wolf Creek, Snake Creek, Turtle Creek, Garrison Creek, the Coal Lake Coulee, Yanktonai Creek, and Charging Creek. Parks and management areas in McLean County include the Lake Susie National Wildlife Refuge, Custer Mine State Game Management Area, Sportsmen’s Centennial Park, De Trobriand State Game Management Area, Deepwater Creek Public Use Area, Deepwater Creek State Game Management Area, Douglas Creek Public Use Area, Douglas Creek State Game Management Area, Lost Lake National Wildlife Refuge, and Riverdale State Game Management Area. Of the previously listed resources, Lake Sakakawea, Lake Audubon, Wolf Creek, and the De Trobriand State Game Management Area are nearest to the section 10 lease tract. A small portion of the section 10 lease tract is within the viewshed of Lake Sakakawea; however, Lake Audubon, Wolf Creek, and the De Trobriand State Game Management Area are not likely within the viewshed of the section 10 lease tract.

The Coal Lake Wildlife Management Area in eastern McLean County is managed by the North Dakota State Game and Fish Department. The wildlife management area was developed through a program in which the Falkirk Mining Company and Great River Energy donated approximately 729 acres of land to the North Dakota Department of Transportation. The area is open to public access for fishing, hunting, trapping, and other outdoor activities (NDDOT 2014). The Coal Lake Wildlife Management Area is not likely within the viewshed of the section 10 lease tract.

The section 10 lease tract is located approximately 1.2 miles northeast of US-83 and approximately 1 mile north of ND-200. County Highway 23 is approximately 0.7 miles west of the section 10 lease tract, and 4th Street NW and 5th Street NW are approximately 0.3 miles south and 0.7 miles north of the section 10 lease tract, respectively. Several smaller paved and unpaved roadways are also in the vicinity of the section 10 lease tract. These highways, streets, and smaller paved and unpaved roadways could be within the viewshed of the section 10 lease tract, depending on how close the viewer was to the lease tract. A farmhouse is located in the southwestern corner of the section 10 lease tract. To date, the Falkirk Mine is in negotiations to purchase this property.

3.14 Water Resources (Groundwater, Surface Water, Wetlands and Waters of the United States)

Water resources are natural and human-made sources of water that are available for use by, and for the benefit of, humans and the environment. Hydrology entails the distribution of water to water resources through the processes of evapotranspiration, atmospheric transport, precipitation, surface



runoff and flow, and subsurface flow. Groundwater is water that exists in the saturated zones beneath the Earth's surface. Surface water resources generally consist of wetlands, lakes, rivers, and streams. Wetlands are defined as areas that are inundated by surface or groundwater with a frequency to support, and under normal circumstances do or would support, a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction.

Groundwater quality and quantity are regulated under several different programs. The Federal Water Pollution Control Act of 1972, as amended by the Clean Water Act (CWA), provides the authority to the EPA and U.S. Army Corps of Engineers (USACE) to establish water quality standards, control discharges into surface and ground waters, develop waste treatment management plans and practices, and issue permits for discharges of pollutants (Section 402) and for dredged or fill material in waters of the United States (Section 404). The Safe Drinking Water Act (SDWA) of 1974, as amended, requires many actions to protect drinking water and its sources (i.e., rivers, lakes, reservoirs, springs, and groundwater wells²). The Federal Underground Injection Control regulations, authorized under the SDWA, require a permit for the discharge or disposal of fluids into a well. The Federal Sole Source Aquifer regulations, also authorized under the SDWA, protect aquifers that are critical to water supply.

Waters of the United States are defined within the CWA, as amended, and jurisdiction is addressed by the EPA and USACE. These agencies assert jurisdiction over (1) traditional navigable waters; (2) wetlands adjacent to navigable waters; (3) non-navigable tributaries of traditional navigable waters that are relatively permanent, where the tributaries typically flow year-round, or have continuous flow at least seasonally (e.g., typically 3 months); and (4) wetlands that directly abut such tributaries. Section 404 of the CWA authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredge or fill into waters of the United States including wetlands. Encroachment into waters of the United States and wetlands requires a permit from the state and Federal government.

Some of the information contained in the following subsections was obtained from Sections 2-2, 2-5, and 2-6 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. Please refer to **Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations**.

Groundwater

The Sentinel Butte and Bullion Creek formations are part of the Fort Union Group, which contains lignite coal beds that are aquifers (Schobert 1995). The major hydrostratigraphic units in the area of the section 10 lease tract consist of glacial till and glacial-derived fluvial sands and gravels associated with the Coleharbor Formation; Hagel A lignite bed, Hagel B lignite bed, and C sand of the Sentinel Butte Formation; and Tavis Creek lignite bed, Coal Lake Coulee lignite bed, and the Hensler sand of the Bullion Creek Formation.

The Coleharbor Formation is the shallowest aquifer in the area, and water wells in the Coleharbor Formation typically have very low yields and capacity. Stratigraphically, the Hagel A bed (ranging from 0.5 to 11.5 feet thick) is the highest, most significant aquifer in the area. Some areas of the Hagel A bed are confined while other areas are under water table conditions. The Hagel B bed (ranging from 0.5 to

² The SDWA does not regulate private wells that serve fewer than 25 individuals.



6.3 feet thick) is below the Hagel A bed. The interburden thickness between the Hagel A and Hagel B beds is usually less than 10 feet, but can range from approximately 0.1 to 35 feet. A few areas of the Hagel B bed are unsaturated to dry, but this aquifer is generally confined. Recharge of the Hagel B bed is primarily leakage from the overlying Hagel A bed. Occurring approximately 30 feet below the Hagel B bed is the C bed. The C bed (typically less than 2 feet thick) is a confined aquifer that receives recharge primarily through leakage from the Hagel B bed. The general trend of the groundwater flow in the Hagel A bed, Hagel B bed, and C bed is from the upland recharge areas to the Missouri River Valley in the south and west, towards the Weller Slough Trench in the north, and towards the Coal Lake Coulee Trench to the east.

Occurring approximately 65 feet below the C bed is the Tavis Creek bed (ranging from 0.5 to 12.2 feet thick). Flow in the Tavis Creek bed takes place under confined conditions from the Weller Slough toward the Missouri River. Recharge of this aquifer is primarily from lateral flow from the north and the Weller Slough and associated filled trench drainages. The Coal Lake Coulee lignite bed is under confined conditions between 25 and 50 feet below the Tavis Creek bed. Flow direction is similar to that of the Tavis Creek bed. Recharge of this aquifer is from the Weller Slough Trench and leakage from the overlying Tavis Creek bed. The Hensler sand is the first aquifer below the Coal Lake Coulee bed. It is part of numerous discontinuous sand units that make up an aquifer zone. Flow in the Hensler sand takes place under confined conditions from the Weller Slough toward the Missouri River. Recharge of this aquifer is primarily from lateral flow from the north and from leakage from overlying aquifers. Maps of the groundwater resources in the area of the section 10 lease tract can be found in Sections 2-2 and 2-5 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. Please refer to **Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations**.

Well certification programs undertaken by the Falkirk Mine have identified 58 water supply wells, 34 of which are not being used, in the area of the section 10 lease tract. All of the wells, including those that were identified as inoperable or abandoned, are certified and water samples have been taken, where possible. There are no water supply wells within the boundary of the section 10 lease tract. Please refer to **Figure 8, Water Wells in the Vicinity of the Section 10 Lease Tract**.



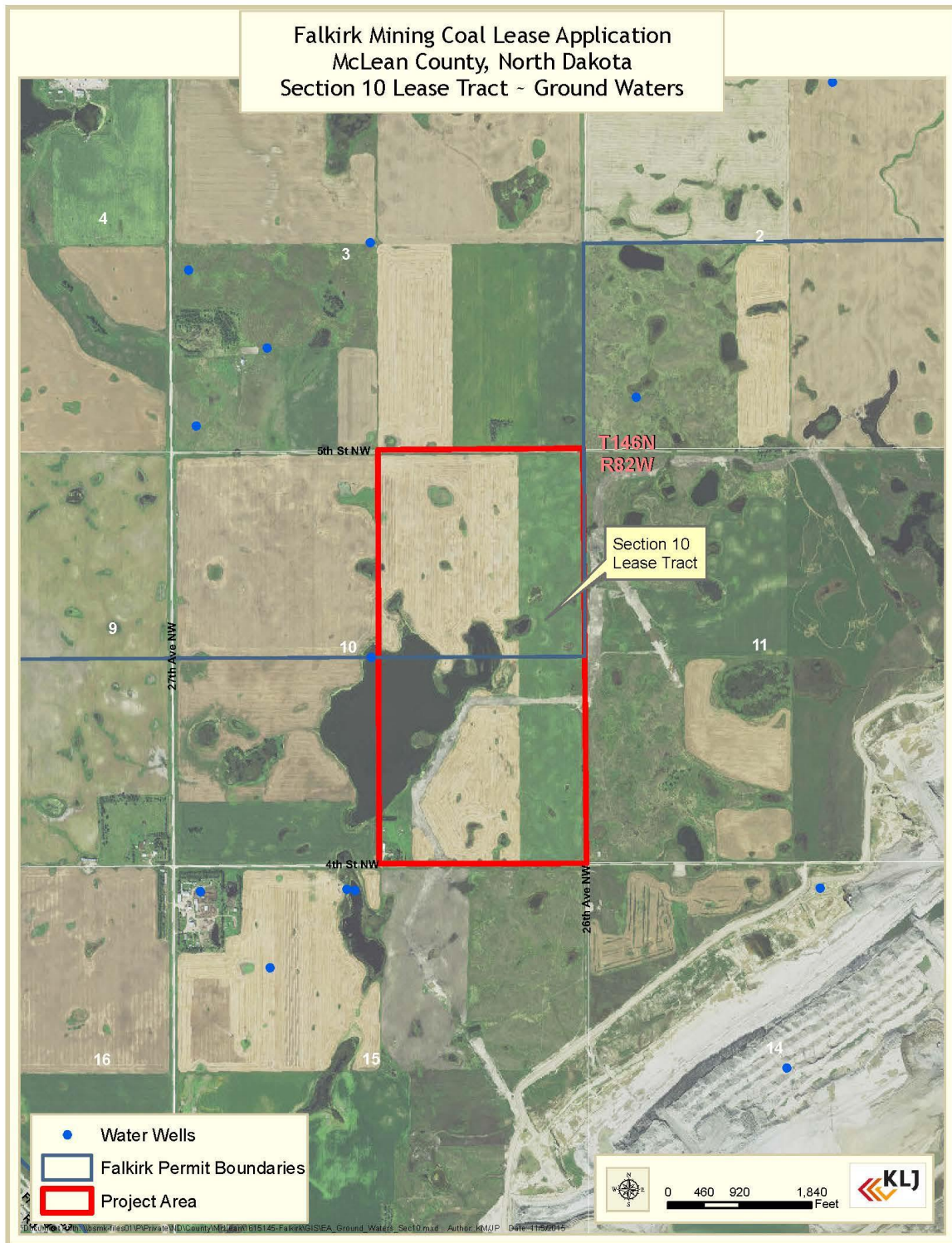


Figure 8, Water Wells in the Vicinity of the Section 10 Lease Tract

Surface Water

The section 10 lease tract and adjacent areas consist of a glacially modified upland area of low relief. Ephemeral streams with multi-basinal to parallel drainage patterns drain the area. Drainage density and stream frequency is low. The section 10 lease tract and adjacent areas are within three drainage basins (Basin A – Underwood Coulee and Basins B and C – Coal Lake Coulee), and the area is divided into five major watersheds with the majority draining to Coal Lake. The section 10 lease tract is specifically located in the Lake Audubon Watershed.

Basin A is a poorly drained basin that drains an area of approximately 12.14 square miles. The drainage pattern of Basin A is multi-basinal to parallel. The Underwood Coulee, which is a major ephemeral stream of the basin, only has one main tributary and ultimately discharges into Samuelson's Slough. Water flows in the channel for only a few days each year and occasionally can inundate large areas. Where undisturbed, the channel is a shallow, concave depression and is generally free of vegetation. The bare channel has a very small discharge capacity. Throughout most of the area, the channel has been obliterated by agricultural activity. The Coal Lake Coulee (Basins B and C) is a hydrologically unique area that acts as a drain for the hydrostratigraphic units of the section 10 lease tract area. Most of the drainage is from perimeter areas through ephemeral stream channels to the interior sloughs, including Coal Lake, within the channel fill. Drainage of these interior sloughs is limited to nonexistent. The only external drainage in the valley of the Coal Lake Coulee begins near its southern end, where an approximate 900-acre drainage (Basin B) forms a channel in the meltwater fill valley and drains to the unnamed slough that drains to the Missouri River. Current stream activity in Basin C is insufficient to form a distinctive channel or provide significant water to areas that could be easily flood irrigated. Water quality is "good" from the side drainages to "marginal" in the valley proper. The watersheds are drained by ephemeral streams. There are no intermittent streams within the section 10 lease tract.

Maps of the surface water resources in the area of the section 10 lease tract can be found in Sections 2-5 and 2-6 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. Please refer to **Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations.**

Wetlands and Waters of the United States

Pre-mining land use analysis conducted in December 2006 for the section 10 lease tract and surrounding areas identified seven temporary wetlands (0.9 acres) and 24 seasonal wetlands (68.7 acres) within the section 10 lease tract. The USFWS National Wetlands Inventory mapped 30 wetlands within the section 10 lease tract, 29 of which are freshwater emergent wetlands and one of which is a freshwater pond. All of the freshwater emergent wetlands mapped are palustrine emergent wetlands that are seasonally flooded. Palustrine emergent wetlands include all nontidal wetlands dominated by trees, shrubs, emergent, mosses, or lichens, and are characterized by erect, rooted, and herbaceous hydrophytes. Surface water is present in these wetlands for extended periods (especially early in the growing season) but is absent by the end of the growing season in most years (USFWS 2015a). No waters of the United States were identified within the section 10 lease tract during the pre-mining land use analysis. On May 31, 1994, the Falkirk Mine received approval from the North Dakota State Water Commission regarding their request (application) to drain in the Falkirk Mine's Northeast Permit Area No. 1, which includes the section 10 lease tract.



CHAPTER 4 ENVIRONMENTAL IMPACTS AND MITIGATION

This chapter summarizes the potential direct and indirect impacts of the Proposed Action and No Action Alternative. Additionally, avoidance, minimization, and mitigation measures to address adverse impacts are also discussed.

Direct effects are caused by the action and occur at the same time and place when the action is implemented (40 CFR 1508.8). Indirect effects are also caused by the action, but occur later in time or farther removed in distance, but are still reasonably foreseeable. Indirect impacts might include growth-inducing impacts and other impacts related to induced changes in the pattern of land use, population density, or growth rate and related impacts on air and water and other natural systems, including ecosystems. (40 CFR 1508.8).

4.1 Air Quality and Climate Resources

Air quality impacts were assessed by evaluating existing operations at the mine, reviewing local and regional air monitoring data, and estimating the potential magnitude of an increases or decreases in air emissions from the alternatives. Air quality impacts would be considered significant if emissions would (1) increase ambient air pollution concentrations above the NAAQS; (2) contribute to an existing violation of the NAAQS; (3) interfere with, or delay timely attainment of, the NAAQS; (4) impair visibility within federally mandated PSD Class I areas; or (5) result in the potential for any new stationary sources to be considered major sources of emissions, as defined in 40 CFR § 52.21 and 40 CFR § 51.165: total emissions of any pollutant subject to regulation under the CAA that are greater than 250 TPY for attainment areas and 100 TPY or less for nonattainment areas, depending on the severity of nonattainment.

Emissions from operations at Falkirk Mine are addressed in the Air Pollution Control Minor Source Permit to Operate (permit no. O79002) issued by the North Dakota Department of Health in April 2016. The permit limits annual coal production through emissions generating equipment at the mine and specifies emission limits for particulate matter and opacity and required air pollution control equipment. The air permit conditions limit total emissions from the mine to below major source thresholds and prevent significant impacts to NAAQS.

Proposed Action

Under the Proposed Action, BLM would be authorizing leasing activities and no direct or indirect impacts on air quality would be expected to occur from this action. However, the intent and purpose of leasing is to develop the coal resources within the proposed lease tract. Therefore, potential direct and indirect air quality impacts from surface mining operations have been evaluated.

Under the proposed action, the primary air pollutant of concern would be PM emissions generated from surface mining activities such as land clearing, blasting, topsoil and overburden removal, coal extraction, coal preparation/handling/storage, and coal haul trucks on roads. Because these particulate emissions are not emitted from a single point such as an exhaust vent or smoke stack, they are referred to as fugitive dust emissions. Fugitive dust control measures are specified in the mine's air permit and a fugitive dust control plan is required as part of its mine permit. In accordance with the Fugitive Dust Control Plan in Section 3-4 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation



Operations, fugitive dust emissions would be reduced by removing topsoil and subsoil in increments, only disturbing areas necessary for operations at any one time. All areas of disturbance would be stabilized as soon as possible using approved revegetation techniques. Fugitive dust from equipment activities and traffic would be reduced by treating road surfaces with approved stabilization agents; using water on roads and problem areas associated with construction, leveling, and other traffic activities; and using dust suppressants during dry periods on haulage and access roads. Please refer to **Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations**. The Falkirk Mine would also be required to implement fugitive dust control measures listed in the air permit.

The proposed action is a continuation of current surface mining and would not authorize a change in already permitted actions or in production levels. Since there would be no modification of existing air emission sources and no new sources, mining operations would continue to occur under the current air quality permit. The Proposed Action would not result in a production increase at the mine. Activity levels and equipment use at the mine would remain the same but would move into the project area. Employee levels would remain essentially unchanged. Therefore, emissions would remain at or near current levels as existing mining operations. The Falkirk Mining Company operated a particulate monitoring network at the mine for over two years during which no exceedance of PM NAAQS were measured. NDDH approved Falkirk's request to terminate PM monitoring on Dec. 31, 1992. No NAAQS exceedances or near exceedances are expected to occur. Please refer to **Table 11, Proposed Action Potential Emissions**.



Table 11, Proposed Action Potential Emissions

ACTIVITY	EMISSIONS GENERATING SOURCE	TYPE OF EMISSIONS ¹	POTENTIAL DURATION	POTENTIAL LEVEL OF IMPACT	ESTIMATED INCREASE/DECREASE IN EMISSIONS FROM PROPOSED ACTION	EMISSIONS CONTROLS ^{2,3}
Drilling (Exploratory and Cropline)	rotary drill rig	PM, NOx, SOx, CO, CO ₂ , HAPs	temporary (a few days)	negligible - minor	potential minor, temporary increase in emissions of listed pollutants	NDAC 33-15-08-01
	construction dust	PM				Fugitive Dust Control Plan, and NDAC 33-15-17
Surface Water Structures Construction	construction equipment (diesel combustion)	PM, NOx, SOx, CO, CO ₂ , HAPs	temporary (a few days)	negligible - minor	potential minor, temporary increase in emissions of listed pollutants	NDAC 33-15-08-01
	construction dust	PM				Fugitive Dust Control Plan, and NDAC 33-15-17
Topsoil and Subsoil Removal	construction equipment (diesel combustion)	PM, NOx, SOx, CO, CO ₂ , HAPs	temporary (days-months)	minor	no increase in emissions over existing operations	NDAC 33-15-08-01
	construction dust	PM				Fugitive Dust Control Plan, and NDAC 33-15-17
Haul Road and Pit Ramp Construction	construction equipment (diesel combustion)	PM, NOx, SOx, CO, CO ₂ , HAPs	temporary (days-months)	minor	no increase in emissions over existing operations	NDAC 33-15-08-01
	construction dust	PM				Fugitive Dust Control Plan, and NDAC 33-15-17
Overburden Removal	Electric Draglines	PM-fugitive dust indirect-CO ₂	temporary (months)	minor	no increase in emissions over existing operations	Fugitive Dust Control Plan, and NDAC 33-15-17
	construction equipment (diesel combustion)	PM, NOx, SOx, CO, CO ₂ , HAPs				NDAC 33-15-08-01

ACTIVITY	EMISSIONS GENERATING SOURCE	TYPE OF EMISSIONS ¹	POTENTIAL DURATION	POTENTIAL LEVEL OF IMPACT	ESTIMATED INCREASE/DECREASE IN EMISSIONS FROM PROPOSED ACTION	EMISSIONS CONTROLS ^{2,3}
Coal Mining, Loading, and Hauling	Dozers, loaders, electric shovels, haul trucks	PM, NO _x , SO _x , CO, CO ₂ , HAPs	temporary (months)	minor	no increase in emissions over existing operations	NDAC 33-15-08-01 Fugitive Dust Control Plan, and NDAC 33-15-17
	fugitive dust	PM				
Coal Processing Primary Crushing	fugitive dust	PM	temporary (months)	minor	no increase in emissions over existing operations	NDAC 33-15-12 Fabric Filter Dust Control System, and PM emission limit = 1.0 lb/hr, and Opacity limit = 20% Production Limit = 20 million tons/year
Coal Processing - Secondary Crushing and Conveying	fugitive dust	PM	temporary (months)	minor	no increase in emissions over existing operations	NDAC 33-15-12 Fabric Filter Dust Control System, and PM emission limit = 1.0 lb/hr, and Opacity limit = 20% Production Limit = 34 million tons/year
Coal Storage Silo	fugitive dust	PM	temporary (months)	minor	no increase in emissions over existing operations	Opacity limit = 20%
Coal Transport	Haul Trucks (diesel combustion)	PM, NO _x , SO _x , CO, CO ₂ , HAPs	temporary (months)	minor	no increase in emissions over existing operations	NDAC 33-15-08-01 Fugitive Dust Control Plan, and NDAC 33-15-17
	Conveyor system	PM	currently not in service	currently no emissions		

¹ PM=particulate matter, NO_x=nitrogen oxides, SO_x=sulfur oxides, CO=carbon monoxide, CO₂=carbon dioxide, HAPs= hazardous air pollutants.

² Emission control requirements from North Dakota Dept. of Health Air Pollution Control Minor Source Permit to Operate #O79002, April 2016.

³ NDAC=North Dakota Administrative Code, Chapter 33-15 Air Pollution Control.

Coal mining operations associated with the Proposed Action are not anticipated to cause or contribute to a violation of any NAAQS or NDAAQS, expose sensitive receptors to substantially increased pollutant concentrations, or exceed any emissions limits listed in the Falkirk Mine Permit to Operate (Permit No. 079002). In accordance with the Falkirk Mine Permit to Operate, the owner/operator would record the monthly coal production (tons per month) on the first day of every month and determine the total coal production (tons per year) during the previous 12-month period. Anytime the total coal production exceeded the allowable production limit listed in the Permit (20.0 x 10⁶ TPY for the truck dump, primary crushing station, and conveyor; 34.0 x 10⁶ TPY for the secondary crushing station and conveyor; and 14.0 x 10⁶ TPY for the east dump/primary crusher/cable belt system), the owner/operator would notify the NDDH within 10 working days. In addition, the owner/operator would conduct mining operations at the section 10 lease tract in accordance with 40 CFR 60, Subpart Y, Standards of Performance for New Stationary Sources: Coal Preparation Plans, as incorporated by Chapter 33-15-12 of the North Dakota Air Pollution Control Rules (NDDH 2011).

The Proposed Action would contribute to emissions of GHGs during surface mining, coal transport, and processing activities at the mine site. Additional (indirect) emissions of GHGs would be generated when the coal is transported, stockpiled, crushed, and combusted to generate electricity. Methane can be emitted from surface mines during mining activities from the coal bed and overlying strata when the overburden is removed as well as during post-mining activities (i.e., coal handling) as the coal is processed, transported, and stored for use. The majority of the CH₄ would likely be emitted from the coal through natural fractures (i.e., cleats) when it is uncovered and exposed along the pit face within the section 10 lease tract. As the coal is extracted and transported from the pit to the truck dump where it is crushed, smaller amounts of CH₄ would be emitted. Following the mining process, it would be expected that very little CH₄ would remain in the coal. CO₂, CH₄, and N₂O would be emitted from combustion of the coal at Great River Energy's Coal Creek Station and at the Spiritwood Station. Emissions of GHGs can be estimated for surface mining, post mining handling activities, and coal combustion using emission factors established by the EPA for North Dakota lignite coal surface mines. Assuming all of the estimated 3.39 million tons of in place lignite coal would be mined, processed, and combusted in a single year the estimated GHG emissions would be approximately 4.76 MMTCO₂eq. Please refer to **Table 12, Estimated Indirect GHG Emissions due to Falkirk Mine** for estimated GHG emissions attributable to the Proposed Action.

According to the EPA's Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2014 (April 2016) the total; GHG emissions reported for the United States in 2014 were 6,870 MMT CO₂eq and the total GHG emissions reported for North Dakota were 56.6 MMTCO₂eq. Therefore, estimated GHG emission due to mining activities under the proposed action would represent approximately less than 0.07 percent of total U.S. GHG emissions and approximately 8 percent of GHG emissions in North Dakota. Estimated GHG emissions from surface mining and post mining activities for lignite coal mines in North Dakota in 2014 were, and 0.14 MMTCO₂eq (excluding combustion). Therefore, estimated GHG emissions from mining and post mining activities under the Proposed Action would represent less than 0.5 percent of GHG emissions from North Dakota surface mines.



Table 12, Estimated Indirect GHG Emissions due to Falkirk Mine

COAL ACTIVITY	ANNUAL COAL PRODUCTION RATE	CO ₂	CH ₄	N ₂ O	CO ₂ EQ
	(TONS/YEAR)	(MILLION METRIC TONS) MMT			
Surface Mining					
Emission factor (kg/ton) ¹	3,390,000	-	0.1611	-	0.014
Estimated Emissions		-	5.46E-04	-	
Post Mining					
Emission factor (kg/ton) ¹	3,390,000	-	0.0345	-	0.003
Estimated Emissions		-	1.17E-04	-	
Coal Combustion					
Emission factor (kg/ton) ¹	3,390,000	1,389	0.156	0.023	4.75
Estimated Emissions		4.709	5.29E-04	7.80E-05	
Total =					4.76

1. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2014 ANNEX 3 Methodological Descriptions for Additional Source or Sink Categories, U.S.EPA, April 2016

The potential impacts from GHG emissions are, by nature, global and cumulative impacts, as individual sources of GHG emissions are not large enough to have an appreciable effect on climate change. Therefore, the impacts of GHG emissions associated with the Proposed Action are discussed in the context of cumulative impacts in **Section 5** of this EA.

Alternative I

Under Alternative I, the 320 acres of land in the east ½ of section 10 would not be leased or mined for coal. The south ½ of section 10 is already permitted and leased for surface disturbance; therefore, surface disturbance, including the removal of topsoil and subsoil, and using the land for other ancillary mining purposes, such as stockpile (i.e. topsoil, subsoil, and overburden) locations, would occur in the southeast ¼ of section 10 (approximately 160 acres). It is important to note that if the east ½ of Section 10 tract is not leased, the demand for coal at associated power production plants (Coal Creek and Spiritwood stations) would continue to exist. In the absence of the Section 10 lease, coal would be obtained from other sources to meet the demand and could result in increased GHG emissions due to obtaining coal with higher carbon contents and longer transport distances.

4.2 Cultural Resources

Potential impacts on historic resources are categorized by criteria established by Section 106 of the NHPA and its implementing regulations (36 CFR § 800). These include “no effect,” “no adverse effect,” or “adverse effect,” which are defined as follows:

- ◆ “No effect” is defined as no historic properties present or there are historic properties present but the undertaking would have no effect upon them as defined in 36 CFR § 800.16(i).



- ◆ “No adverse effect” is defined as “when the undertaking’s effects do not meet the criteria of 36 CFR § 800.5(a)(1) ‘adverse effect’ or the undertaking is modified or conditions are imposed to avoid adverse effects.” A proposed action results in a “no adverse effect” determination when the impacts on a historic property are minimal but do not completely alter the historic characteristics that qualify it for eligibility in the NRHP.
- ◆ “Adverse effect” is defined as when the undertaking could alter, directly or indirectly, impact any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that could have been identified subsequent to the original evaluation of the property’s eligibility for the NRHP (36 CFR § 800.5(a)).

Proposed Action

Provided that all ground disturbing activity takes place within the inventoried area and previously inventoried areas described in Section 3.2, the BLM gives a finding of “no effect” on cultural resources for the proposed project. A determination of “No Historic Properties Affected” was also given by the North Dakota SHPO. If cultural resources are discovered during construction, work would be immediately stopped, the site would be secured, and the BLM would be notified. Work would not resume until written authorization to proceed was received from the BLM. All personnel would be prohibited from collecting artifacts or disturbing cultural resources in any area under any circumstances.

Alternative I

If the federal and private coal lease tract in Section 10 is not leased or mined, the land immediately adjacent to the tract in question would continue to be mined and reclaimed as planned. Since the adjacent tract is permitted and leased for surface disturbance, a significant amount of surface disturbances would still occur within the southeast ¼ of Section 10 including the stripping of topsoil and subsoil and utilizing the land for other ancillary mining features such as stockpile locations (i.e. topsoil, subsoil, and overburden). Provided that all construction activity takes place within the inventoried area and previously inventoried areas described in Section 3.2, the BLM gives a finding of “no effect” on cultural resources. If cultural resources are discovered during topsoil/subsoil removal, work would be immediately stopped, the site would be secured, and the BLM would be notified. Work would not resume until written authorization to proceed was received from the BLM. All personnel would be prohibited from collecting artifacts or disturbing cultural resources in any area under any circumstances.

4.3 General Wildlife

The significance of impacts on wildlife is based on (1) the importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource, (2) the proportion of the resource that would be affected relative to its occurrence in the region, (3) the sensitivity of the resource to proposed activities, and (4) the duration of ecological effects. A habitat perspective is used to provide a framework for analysis of general classes of impacts (e.g., noise, human disturbance). Noise associated with a proposed action might be of sufficient magnitude to result in the direct loss of individuals, render habitat unsuitable, or reduce reproductive output within certain ecological settings.



Proposed Action

Under the Proposed Action, no direct or indirect impacts on wildlife would be expected from leasing activities.

Direct and indirect impacts on wildlife would be expected from mining activities associated with the Proposed Action. Short-term, direct impacts on wildlife would be expected from the temporary loss of wildlife habitat in the section 10 lease tract. In accordance with the Falkirk Mine Fish and Wildlife Management Plan, during mining activities, a myriad of sediment-control ponds and SPGM stockpiles would be located throughout the perimeter of the section 10 lease tract, immediately outside the active mining zones. These features and associated areas of disturbance surrounding them would be planted with a grass/forb mixture for erosion stabilization. The vegetation, once established, would become dense nesting cover, which would provide suitable nesting cover for waterfowl and other upland bird species. These cover and water developments would provide an interim enhancement for many wildlife species during mining and initial reclamation operations. Herbicides used to control noxious weeds would be applied with care by licensed and trained contractors to avoid potential impacts on wildlife and associated habitat.

Reclamation plans would include establishing field windbreaks across the post-mine landscape. The windbreaks would be designed using a pattern type arrangement to ensure compatibility with farming operations and use of the windbreaks by wildlife. The addition of the field windbreaks would help protect the post-mine soil resources in the section 10 lease tract, while adding considerable wildlife habitat values to the cropland. The Falkirk Mine would manage the tame grassland areas by using a combination of rotation grazing, burning, and haying. All of the tame grassland acres would be reclaimed upon completion of mining activities. Wetlands in the east ½ of the section 10 lease tract would be replaced to ensure no net loss of wetland acreage, minimize hindrance to farming, and maximize wildlife use. Post-mining temporary and seasonal wetland acreages would be at least equal to the pre-mining wetland acreages. The design of the post-mining wetland would be based on the wetland classification, pre-mining wetland acreage, watershed area, and annual runoff yield.

The Falkirk Mine Fish and Wildlife Management Plan is in Section 2-4 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. Please refer to **Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations**.

Short-term, indirect impacts on wildlife would be expected from mining activities in the section 10 lease tract due to noise. Disturbances (e.g., noise and motion) from mining activities and heavy equipment use could cause wildlife to engage in escape or avoidance behaviors. Most wildlife species in the section 10 lease tract would be expected to quickly recover once the mining activities ceased, or habituate to the disturbances altogether. Noise generated during mining activities could result in temporary disturbance to migratory birds; however, it is anticipated that migratory birds would avoid the pit operation areas and use other areas of the section 10 lease tract and surrounding areas.

The MBTA and EO 13186 require Federal agencies to minimize or avoid impacts on migratory birds listed in 50 CFR 10.13. If design and implementation of a proposed project cannot avoid measurable adverse impacts on migratory birds, EO 13186 requires the responsible agency to consult with the USFWS and obtain a Migratory Bird Depredation Permit. Mining activities would be conducted in a manner to avoid adverse impacts on migratory birds to the extent practicable. While mitigation



measures are not required, the following environmental protection measures could be implemented for reduction or avoidance of impacts on migratory birds that could occur within the section 10 lease tract:

- ◆ Any groundbreaking activities or tree-cutting activities would be performed before migratory birds return to the section 10 lease tract or after all young have fledged to avoid incidental take.
- ◆ If mining activities are scheduled to start during the period when migratory birds are present, a site-specific survey for nesting migratory birds would be performed immediately prior to mining activities by a qualified biologist.
- ◆ If nesting birds are found in during the survey, buffer areas would be established around nests. Mining activities would be deferred in buffer areas until birds have left the nest. Confirmation that all young have fledged would be made by a qualified biologist.

In accordance with the Falkirk Mine Wildlife Monitoring Plan, wildlife species and habitat types and subtypes would be monitored before, during, and after mining activities to assess the short- and long-term impacts on wildlife species. Monitoring efforts would be centered on wildlife usage of high-value habitats including wetlands, shelterbelts, cropland, and native grassland habitats. Waterfowl breeding and production surveys would be conducted in the spring and early summer on a selected number of wetlands, the use of wetlands in the fall by migratory waterfowl would be documented and recorded, and any small mammals or birds using the wetlands would be closely monitored. Breeding bird census would be conducted on study plots within disturbed and reclaimed areas throughout the active mining areas. Upland gamebird production counts and breeding surveys would be conducted, and sightings of large mammals, furbearers, mid-sized mammals, and raptor nests would be recorded.

Wildlife monitoring under the Falkirk Mine Wildlife Monitoring Plan would continue as an ongoing program throughout the various stages of mining within the section 10 lease tract. As the pre-mining habitats are disturbed and transformed into disturbed area habitat types, monitoring activities on an annual basis would focus on key indicator species. As the mining progressed to the point where reclaimed habitat types began to appear, close monitoring of wildlife usage within these reclaimed habitat types would commence. The Falkirk Mine's environmental personnel would maintain contact with the North Dakota PSC, USFWS, and the North Dakota Game and Fish Department by occasionally requesting field trips in which all parties would have a chance to discuss site-specific techniques that were being used and their success or failure. In addition, a biennial monitoring report would be submitted to all three agencies by March 15 of even numbered years to inform them of the progress of the monitoring program.

Alternative I

Under Alternative I, the 320 acres of land in the east ½ of section 10 would not be leased or mined for coal. The south ½ of section 10 is already permitted and leased for surface disturbance; therefore, surface disturbance, including the removal of topsoil and subsoil, and using the land for other ancillary mining purposes, such as stockpile (i.e. topsoil, subsoil, and overburden) locations, would occur in the southeast ¼ of section 10 (approximately 160 acres).

Short-term, direct impacts on wildlife would be expected from the temporary loss of wildlife habitat in the southeast ¼ of section 10. Reclamation activities for surface disturbance would be similar to those



discussed under the Proposed Action. In addition, all native grassland in the southeast ¼ of section 10 would be reclaimed upon completion of surface disturbance by using a combination of rotation, grazing, and haying. All native grassland would be managed to accommodate area wildlife.

4.4 Geological, Mineral, and Paleontological Resources

Proposed Action

Under the Proposed Action, no direct or indirect impacts on geological, mineral, or paleontological resources would be expected from leasing activities.

Long-term, direct and indirect impacts on geological resources would be expected from mining activities associated with the Proposed Action. Direct impacts on physiography would be expected from surface disturbance from mining activities. Except for the removal of the coal beds, the overall nature of the geological and mineral resources of the area is not anticipated to change. There is a 95 percent chance that there is approximately 368 billion ft³ of continuous (unconventional) gas resources contained in the Fort Union Formation coal beds. Therefore, it is likely that there are continuous gas resources in the mining areas of the section 10 lease tract that could be lost from mining activities. Indirect impacts on topography would be expected from subsidence over mined areas. In general, subsidence would be uniform over broad areas. The surface effects of subsidence would depend on characteristics of the overburden, depth of mining below the surface, and thickness of the coal beds removed. The overall effects from subsidence are anticipated to be minor over the short-term and negligible over the long-term.

The areas mined in the section 10 lease tract would include the Hagel A coal bed and Hagel B coal bed. The overburden would be removed by a single-pass operation, with the pit widths varying from 90 to 300 feet, depending on the overburden depth and stability of the material in the section 10 lease tract; overburden depths could be as high as 130 feet. The remaining overburden material in the pits would be side cast into the adjacent open pit once the coal has been removed. Because the dragline and truck-shovel fleet would remove both the overburden and interburden, overburden and interburden mixing of the spoil material would be expected. The initial boxcuts would be excavated with 32-yard class tractor-scrapers, a truck/shovel fleet, or a dragline. The boxcut material would be cast or hauled into the 'out of pit spoil area' or onto the succeeding pit area if opened by the dragline. After the overburden and boxcut material were removed, the surface of the exposed Hagel A bed would be cleaned to reduce ash contamination, mined, and loaded into bottom-dump haul trucks for transport to the Coal Handling Facility (i.e., stockpile area capable of storing 500,000 tons of lignite, a truck dump, and crushing and conveyor facilities). After the Hagel A bed has been removed, the interburden between the Hagel A and Hagel B beds would be removed. The surface of the exposed Hagel B bed would be cleaned, mined, loaded, and transported in the same manner as the Hagel A bed. The Mine Plan, discussed in the Falkirk Permit Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations, considers maximizing the utilization and conservation of the coal being mined in order to minimize future redistribution of the land. Please refer to **Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations**.

The Falkirk Mine would be required to rough grade spoils within 180 days following coal removal. Upon completion of coal removal, the overburden would be backfilled, followed by subsoil, topsoil, and revegetation. The overburden material would be graded or leveled to the approximate original



contour. Sampling of the final graded spoil would be conducted to determine the chemical and physical characteristics of the material, and results would be submitted to the North Dakota PSC prior to subsoil replacement. GPS equipment would be used on bulldozers to ensure proper respread thicknesses of topsoil and subsoil. The Falkirk Mine would be required to respread and seed all mined areas within 3 years from coal removal activities. As soon as topsoil is respread, farming equipment would be used to revegetate and maintain reclaimed areas to the approved post mine land uses. All areas would be reclaimed to the gentlest topography consistent with adjacent unmined land. Any highwalls resulting from the final cut would be graded to comply with existing applicable state and Federal regulations. Upon completion of final grading, surface drainage patterns would be reestablished to approximate the general basins that existed prior to mining. In some areas, gravel and sand lenses have been identified in the soil material. These materials would not be salvaged as SPGM, and could potentially be spoiled or used as haul road fill.

Long-term, direct impacts on paleontological resources could be expected from mining activities associated with the Proposed Action. Overburden and coal removal could disturb paleontological resources of scientific interest (e.g., flora, clam, insect, fish, bird, amphibian, and mammal fossils) potentially contained in the Sentinel Butte and Coleharbor formations. It is unlikely that there are paleontological resources of scientific interest contained in the Oahe Formation.

Prior to any ground disturbance, an assessment of the potential impacts on paleontological resources should be conducted by a professional permitted paleontologist. The assessment would be in accordance with current best management practices and could include a museum and literature search to assess past scientifically important finds in the area, verification and identification of geological formations impacted, and a field survey to determine the presence of paleontological resources and potential salvage value of any discovered resources. The results of the assessment would be the basis for the paleontologist to formulate a mitigation plan and recommendation for proceeding with the proposed mining. At a minimum, the mitigation plan would include an Unanticipated Discovery Plan that outlines the roles and responsibilities of all parties and the steps required for professionally assessing any finds.

Alternative I

Under Alternative I, the 320 acres of land in the east ½ of section 10 would not be leased or mined for coal. The south ½ of section 10 is already permitted and leased for surface disturbance; therefore, surface disturbance, including the removal of topsoil and subsoil, and using the land for other ancillary mining purposes, such as stockpile (i.e. topsoil, subsoil, and overburden) locations, would occur in the southeast ¼ of section 10 (approximately 160 acres).

Short-term, direct impacts on physiography would be expected from surface disturbance; however, the overall nature of the geological resources of the area is not anticipated to change. Reclamation activities for surface disturbance would be similar to those discussed under the Proposed Action. No direct or indirect impacts on mineral or paleontological resources would be expected, as there would be no removal of overburden or coal under Alternative I.



4.5 Hazardous Materials and Wastes and Solid Waste

Proposed Action

Under the Proposed Action, no direct or indirect impacts would be expected from leasing activities. No hazardous materials would be used, and there would be no generation of hazardous or solid wastes associated with the leasing activities.

No direct or indirect impacts would be expected from mining activities associated with the Proposed Action. No hazardous materials would be used, and there would be no generation of hazardous wastes in the section 10 lease tract. Any non-coal wastes (e.g., trees, brush, wood materials, brick, concrete block, cured concrete, plastic materials, and pipe) generated from mining operations in the section 10 lease tract would be minimal and temporarily stored in a controlled manner in a designated and approved portion of the section 10 lease tract. Disposal of the non-coal wastes would occur in approved mining pits on land under the Falkirk Mine ownership. Any increases in the generation of municipal solid waste (e.g., food scraps, paper, and product packaging) from mining operations in the section 10 lease tract would be minimal and is not anticipated to exceed the capacities of nearby municipal solid waste disposal facilities.

Alternative I

Under Alternative I, the 320 acres of land in the east ½ of section 10 would not be leased or mined for coal. The south ½ of section 10 is already permitted and leased for surface disturbance; therefore, surface disturbance, including the removal of topsoil and subsoil, and using the land for other ancillary mining purposes, such as stockpile (i.e. topsoil, subsoil, and overburden) locations, would occur in the southeast ¼ of section 10 (approximately 160 acres).

No direct or indirect impacts would be expected. No hazardous materials would be used, and there would be no generation of hazardous wastes in the southeast ¼ of section 10. Wastes (e.g., trees, brush, wood materials, brick, concrete block, cured concrete, plastic materials, and pipe) generated from surface disturbance would be minimal and temporarily stored in a controlled manner in a designated and approved location. Disposal of the wastes would occur in approved mining pits on land under the Falkirk Mine ownership. Any increases in the generation of municipal solid waste (e.g., food scraps, paper, and product packaging) from surface disturbance would be minimal and is not anticipated to exceed the capacities of nearby municipal solid waste disposal facilities.

4.6 Noise

Noise impact analyses typically evaluate potential changes to the existing noise environment that would result from implementation of a project. Significance of noise and vibration impacts depends on whether or not a project would increase noise levels above the existing ambient levels by introducing new sources of noise.

Proposed Action

Under the Proposed Action, no direct or indirect impacts on the noise environment would be expected from leasing activities.

No direct impacts on the noise environment would be expected from mining activities associated with the Proposed Action. However, indirect impacts on the noise environment would be expected from



mining activities in the section 10 lease tract. Noise from mining activities would vary depending on the type of equipment used, the area that the mining would occur in, and the distance from the noise source. Noise emanating from mining equipment would be localized, short-term, and intermittent during machinery operations. OSHA estimates that the median noise level for mining activities is approximately 88.04 dbA, which is considered to be moderately annoying to sensitive noise receptors. Suitable mufflers on all internal combustion engines and certain compressor components would be used to minimize any increases in noise from mining activities. Since the nearest sensitive noise receptors (a few scattered farm houses) are approximately 1 mile northeast of the section 10 lease tract, it is not anticipated that they would be directly impacted from the mining activities. Other sensitive noise receptors including several residences, approximately 1.5 miles southwest in the City of Underwood, and two churches and one school, approximately 1.9 miles southwest of the section 10 lease tract, would not be directly or indirectly impacted by noise from mining activities, due to their distance from the section 10 lease tract. Noise monitoring associated with mining activities would not be required in the section 10 lease tract.

Alternative I

Under Alternative I, the 320 acres of land in the east $\frac{1}{2}$ of section 10 would not be leased or mined for coal. The south $\frac{1}{2}$ of section 10 is already permitted and leased for surface disturbance; therefore, surface disturbance, including the removal of topsoil and subsoil, and using the land for other ancillary mining purposes, such as stockpile (i.e. topsoil, subsoil, and overburden) locations, would occur in the southeast $\frac{1}{4}$ of section 10 (approximately 160 acres).

No direct impacts on the noise environment would be expected. However, indirect impacts on the noise environment would be expected from surface disturbance. Noise from surface disturbance would vary depending on the type of equipment used, the area that the surface disturbance would occur in, and the distance from the noise source. Noise emanating from equipment would be localized, short-term, and intermittent during machinery operations. Suitable mufflers on all internal combustion engines and certain compressor components would be used to minimize any increases in noise from surface disturbance. Since the nearest sensitive noise receptors (a few scattered farm houses) are approximately 1 mile northeast of section 10, it is not anticipated that they would be directly impacted from surface disturbance. Other sensitive noise receptors including several residences, approximately 1.5 miles southwest in the City of Underwood and two churches and one school, approximately 1.9 miles southwest of section 10, would not be directly or indirectly impacted by noise from surface disturbance, due to their distance from section 10. Noise monitoring associated with surface disturbance would not be required in the southeast $\frac{1}{4}$ of section 10.

4.7 Prime and Unique Farmlands

Proposed Action

Under the Proposed Action, no direct or indirect impacts on prime or unique farmlands or farmland of statewide importance would be expected from leasing activities.

No direct or indirect impacts on prime or unique farmlands would be expected from mining activities associated with the Proposed Action; however, short-term, direct impacts on farmland of statewide importance could be expected from mining activities associated with the Proposed Action. Approximately 170 acres of farmland of statewide importance are located within the section 10 lease



tract and could be converted to nonagricultural uses. The Falkirk Mine would be required to prepare a Form AD-1006, Farmland Conversion Impact Rating, and submit it to the NRCS for review. Upon receipt of the Form AD-1006, the NRCS would determine whether or not the proposed mining activities would impact the farmland of statewide importance. If the NRCS determined that the proposed project would impact farmland of statewide importance in the section 10 lease tract, the Falkirk Mine would be required to avoid, minimize, or mitigate for the conversion of the farmland of statewide importance.

In accordance with the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations, Volumes of topsoil and subsoil in prime soils areas would be removed to ensure that 48 inches of material would be replaced. Topsoil stripped would generally consist of a combination of “A horizon” materials and other available SPGM that would create a final soil having a productive capacity equal to, or greater than, that which existed prior to mining. Reclamation research in North Dakota demonstrating methods for returning full premining yields has been conducted generally using two lifts: (1) topsoil composed of the “A horizon” and the upper “B horizon” and (2) subsoil composed of the lower “B and C horizons.” This two-lift method, currently in use for all surface mined lands in North Dakota, has been shown to be effective in reclaiming croplands to their full premining yield potential. Please refer to **Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations**.

Alternative I

Under Alternative I, the 320 acres of land in the east ½ of section 10 would not be leased or mined for coal. The south ½ of section 10 is already permitted and leased for surface disturbance; therefore, surface disturbance, including the removal of topsoil and subsoil, and using the land for other ancillary mining purposes, such as stockpile (i.e. topsoil, subsoil, and overburden) locations, would occur in the southeast ¼ of section 10 (approximately 160 acres).

No direct or indirect impacts on prime or unique farmlands would be expected from surface disturbance; however, short-term, direct impacts on farmland of statewide importance could be expected. There are approximately 170 acres of farmland of statewide importance in section 10, some of which, could be converted to nonagricultural uses under Alternative I. Similar to the Proposed Action, the Falkirk Mine would be required to prepare a Form AD-1006, Farmland Conversion Impact Rating, and submit it to the NRCS for review. If the NRCS determined that the surface disturbance would impact farmland of statewide importance in the southeast ¼ of section 10, the Falkirk Mine would be required to avoid, minimize, or mitigate for the conversion of the farmland of statewide importance. Mitigation for the conversion of farmland of statewide importance in the southeast ¼ of section 10 would be the same as the mitigation discussed under the Proposed Action.

4.8 Socioeconomics and Environmental Justice

NEPA does not provide specific thresholds of significance for assessment of impacts on socioeconomic resources. Significance varies depending on the context of a proposed project (40 CFR 1508.27[a]).

Proposed Action

Under the Proposed Action, private ownership of the mineral estate in the section 10 lease tract would receive lease bonus payments and production royalty payments for the leasing and mining of their coal interest, which would increase their incomes and temporarily stimulate the local economy and increase local business volume during the 4-month-long lease term. Leasing activities associated with the



Proposed Action would not result in substantial changes to the current economic conditions of the region, displace substantial numbers of people, substantially reduce the number of available housing units, cause a substantial decrease in property values, disproportionately affect minority or low-income populations, or cause any environmental health and safety risks that would disproportionately affect populations of children.

Mining activities in the section 10 lease tract are expected to provide four months-worth of production for the Falkirk Mine. During that time, temporary increases in employment and local business volume would be expected due to increases in payroll taxes, sales receipts, and the indirect purchase of goods and services. Mining activities associated with the Proposed Action would not result in substantial changes to the current economic conditions of the region, displace substantial numbers of people, or substantially reduce the number of available housing units within the study area (i.e., McLean, Mercer, and Oliver counties). According to the 2009-2013 ACS Survey, there was an estimated 2,666 vacant housing units within the study area (Census Bureau 2009-2013a). Any mining workers that would temporarily relocate to the study area during mining activities would not be expected to substantially reduce the number of available housing units or cause a substantial decrease in property values. The purchase of the farmhouse located in the southwestern corner of the section 10 lease tract by the Falkirk Mine would not result in a substantial reduction in the number of available housing units or result in a substantial decrease in property values.

The study area contains lower minority populations in comparison to the State of North Dakota. In addition, the study area has lower percentages of individuals living below the poverty level in comparison to the State of North Dakota. Mining activities would be temporary and concentrated in section 10 lease tract; therefore, no minority or low-income populations would be disproportionately affected by mining activities associated with the Proposed Action. Similarly, there are no environmental health and safety risks identified that would disproportionately affect populations of children, as mining activities would occur entirely within section 10 lease tract, which would be fenced and appropriately marked with signs to prevent trespassing.

Alternative I

Under Alternative I, the 320 acres of land in the east ½ of section 10 would not be leased or mined for coal. Temporary increases in employment and local business volume associated with leasing and mining activities in the east ½ of the section 10 lease tract would not be realized.

4.9 Soils

Proposed Action

Under the Proposed Action, no direct or indirect impacts on soils would be expected from leasing activities.

Short-term, direct impacts on soils in the section 10 lease tract would be expected from mining activities associated with the Proposed Action. In general, mining activities can impact soils by changing their structure, organic content, fertility, infiltration, and permeability. Soils identified in the section 10 lease tract have a low to moderate susceptibility to sheet and rill erosion, low to moderate infiltration rate, and moderate to high runoff rate; however, the soils can tolerate higher rates of erosion without loss of productivity.



During mining activities topsoil and subsoil would be removed with tractor-scrappers or dozers and excavators in conjunction with end-dump trucks using two lifts: (1) topsoil would be removed until all black soil is removed and (2) subsoil would be removed after the topsoil is removed. The SPGM would either be stockpiled in areas designated for topsoil and subsoil stockpiles or directly respread onto approved regraded areas. The total volume of topsoil and subsoil removed would be sufficient to respread 24, 36, or 48 inches of material, depending on projected regraded spoil characteristics. In areas where there would be inadequate volumes of suitable soil material to meet the projected respread depths, all available suitable material would be removed and respread uniformly. The Falkirk Mine would submit an SPGM removal plan prior to each SPGM removal season to the North Dakota PSC. The plan would address the volume of SPGM projected to be salvaged during the season and would include a map depicting the SPGM removal operations.

Overburden would be scarified prior to subsoil replacement. Topsoil and subsoil material would be respread on approved areas with tractor-scrappers or end-dump trucks with a dozer and motor grader assist. To ensure proper respreads depth control, the approved respread area would either be staked on 100-foot centers with wood lath marked with the appropriate respread depth or a GPS would be used. Once the SPGM is replaced, it would be mulched and seeded.

Alternative I

Under Alternative I, the 320 acres of land in the east ½ of section 10 would not be leased or mined for coal. The south ½ of section 10 is already permitted and leased for surface disturbance; therefore, surface disturbance, including the removal of topsoil and subsoil, and using the land for other ancillary mining purposes, such as stockpile (i.e. topsoil, subsoil, and overburden) locations, would occur in the southeast ¼ of section 10 (approximately 160 acres).

Short-term, direct impacts on soils in the southeast ¼ of section 10 would be expected from surface disturbance. In general, surface disturbance can impact soils by changing their structure, organic content, fertility, infiltration, and permeability. During surface disturbance, topsoil and subsoil would be removed with tractor-scrappers or dozers and excavators in conjunction with end-dump trucks using two lifts: (1) topsoil would be removed until all black soil is removed and (2) subsoil would be removed after the topsoil is removed. Reclamation activities for surface disturbance would be similar to those discussed under the Proposed Action.

4.10 Threatened, Endangered, Proposed, and Candidate Species

Under the ESA Section 7(a)(2), each Federal agency is required to ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered or threatened species, or adversely modify or destroy designated Critical Habitat. Under the ESA, “jeopardy” occurs when an action is reasonably expected, directly or indirectly, to diminish a species’ numbers, reproduction, or distribution so that the likelihood of survival and recovery in the wild is appreciably reduced. Federal agency action proponents are responsible for making one of the following effects determinations (16 U.S.C. § 1531–1543):

- ◆ “No Effect” is the appropriate determination when a proposed action would have no effect on listed species or designated Critical Habitat. For this determination, the effects of a proposed action should be temporally or spatially separated from the listed species. This determination is made by the action agency and does not require further consultation.



- ◆ “May Affect, but Not Likely to Adversely Affect” is the appropriate determination when the effects of the action on listed species or designated Critical Habitat would be discountable, insignificant, or wholly beneficial. In order to receive concurrence with this determination, the action agency must initiate informal Section 7 consultation.
- ◆ “Likely to Adversely Affect” is the appropriate determination if any adverse effects on listed species or designated Critical Habitat could occur as a direct or indirect result of a proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or beneficial. Initiation of formal Section 7 consultation would be required and the USFWS would be responsible for completing a biological opinion on the action (and could issue an incidental take statement).

The effects determinations discussed in the following subsections were completed based on information contained in the Falkirk Mine Wildlife Monitoring Plan and Section 2-4 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. Please refer to **Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations**.

Proposed Action

Under the Proposed Action, no effect on threatened or endangered species would be expected from leasing activities.

Table 10 summarizes the effects determinations and preferred and potential habitats in the section 10 lease tract for the threatened and endangered species potentially impacted by mining activities conducted in the section 10 lease tract. Please refer to **Table 13, Summary of Effects Determinations for Species in the Section 10 Lease Tract**.

In accordance with the Falkirk Mine Fish and Wildlife Management Plan, during mining activities, a myriad of sediment-control ponds and SPGM stockpiles would be located throughout the perimeter of the section 10 lease tract, immediately outside the active mining zones. These features and associated areas of disturbance surrounding them would be planted with a grass/forb mixture for erosion stabilization. The vegetation, once established, would become dense nesting cover, which would provide suitable nesting cover. These cover and water developments would provide an interim enhancement for many wildlife species during mining and initial reclamation operations.

No effect on threatened, endangered, or candidate species would be expected from noise or visual disturbances associated with mining activities and heavy equipment use, as these species would be expected to quickly recover once the noise and disturbances from mining activities ceased.

In accordance with the Falkirk Mine Wildlife Monitoring Plan, wildlife species and habitat types and subtypes would be monitored before, during, and after mining activities to assess the short- and long-term impacts on wildlife species. Monitoring efforts would be centered on wildlife usage of high-value habitats including wetlands, shelterbelts, cropland, and native grassland habitats. Waterfowl breeding and production surveys would be conducted in the spring and early summer on a selected number of wetlands, the use of wetlands in the fall by migratory waterfowl would be documented and recorded, and any small mammals or birds using the wetlands would be closely monitored. Breeding bird census would be conducted on study plots within disturbed and reclaimed areas throughout the active mining areas. Habitats capable of supporting threatened, endangered, and candidate species would be searched throughout various stages of mining, and subsequent sightings would be recorded by species,



date, location, habitat type, and behavioral activity. The presence of any Federal listed plant or animal, bald or golden eagles, or bald or golden eagles' nests or eggs in the section 10 lease tract would be reported to the North Dakota PSC.

Table 13, Summary of Effects Determinations for Species in the Section 10 Lease Tract

SPECIES	FEDERAL LISTING STATUS	PREFERRED HABITAT ^(a)	POTENTIAL HABITAT ^(b)	EFFECTS DETERMINATION	ADDITIONAL CONSIDERATION
Gray Wolf	Endangered ^(c)	Forests, Mountains, Grasslands	Tame Grassland	No Effect	The gray wolf is known to tolerate human disturbances.
Whooping Crane	Endangered	Palustrine Wetlands, Cropland	Palustrine Wetlands	May Affect, but Not Likely to Adversely Affect ^(d)	Potential impacts would be temporary due to reclamation and mitigation.
Least Tern	Endangered	Missouri River, Lake Sakakawea	None	No Effect	None
Pallid Sturgeon	Endangered	Missouri River, Lake Sakakawea	None	No Effect	None
Piping Plover	Threatened	Missouri River, Lake Sakakawea, Alkaline Wetlands	None	No Effect	None
Red Knot	Threatened	Missouri River, Lake Audubon, Lake Sakakawea	None	No Effect	None
Dakota Skipper	Threatened	Low (Wet) Native Grassland, Upland (Dry) Native Grassland	None	No Effect	None
Northern Long-Eared Bat	Threatened	Forests, Woodlots, Fence Rows, Riparian Forests, Shelterbelts	Shelterbelts	No Effect	The removal of trees and woody vegetation would occur in the late fall through the winter months. Post-mining reclamation would include the restoration of land use, including shelterbelts.

Notes:

- Preferred habitat refers to the species' general preferred habitat.
- Potential habitat refers to the potential habitat for the species within the boundaries of the section 10 lease tract.
- The gray wolf is considered endangered west of US-83.
- All necessary consultation regarding the whooping crane was completed by the Falkirk Mine during the North Dakota PSC application process. Additionally, the BLM received concurrence from the USFWS on 7 July 2015, which stated that the proposed project is not expected to have significant impacts on fish and wildlife.



Wildlife monitoring would continue as an ongoing program throughout the various stages of mining within the section 10 lease tract. As the pre-mining habitats are disturbed and transformed into disturbed area habitat types, monitoring activities on an annual basis would focus on key indicator species. As the mining progressed to the point where reclaimed habitat types began to appear, close monitoring of wildlife usage within these reclaimed habitat types would commence. The Falkirk Mine's environmental personnel would maintain contact with the North Dakota PSC, USFWS, and the North Dakota Game and Fish Department by occasionally requesting field trips in which all parties would have a chance to discuss site-specific techniques that were being used and their success or failure. In addition, a biennial monitoring report would be submitted to all three agencies by March 15 of even numbered years to inform them of the progress of the monitoring program.

Reclamation plans would include establishing shelterbelts/windbreaks across the post-mine landscape. The windbreaks would be designed using a pattern type arrangement to ensure compatibility with farming operations and use of the windbreaks by wildlife. The addition of the field windbreaks would help protect the post-mine soil resources in the section 10 lease tract, while adding considerable wildlife habitat values to the cropland. The Falkirk Mine would manage the tame grassland areas by using a combination of rotation grazing, burning, and haying. All of the tame grassland acres would be reclaimed post-mining. Wetlands in the east ½ of the section 10 lease tract would be replaced to ensure no net loss of wetland acreage, minimize hindrance to farming, and maximize wildlife use. Post-mining temporary and seasonal wetland acreages would be at least equal to the pre-mining wetland acreages. The design of the post-mining wetland would be based on the wetland classification, pre-mining wetland acreage, watershed area, and annual runoff yield.

Alternative I

Under Alternative I, the 320 acres of land in the east ½ of section 10 would not be leased or mined for coal. The south ½ of section 10 is already permitted and leased for surface disturbance; therefore, surface disturbance, including the removal of topsoil and subsoil, and using the land for other ancillary mining purposes, such as stockpile (i.e. topsoil, subsoil, and overburden) locations, would occur in the southeast ¼ of section 10 (approximately 160 acres).

Effects determinations for threatened, endangered, and candidate species from surface disturbance would be similar to those described under the Proposed Action. Impacts resulting from noise and motion from surface disturbance would be similar to those described under the Proposed Action. Wildlife monitoring, pre- and post-surface disturbance management, and reclamation activities for Alternative I would be similar to those discussed under the Proposed Action. In addition, all native grassland in the section 10 lease tract would be reclaimed upon completion of surface disturbance by using a combination of rotation, grazing, and haying. All native grassland would be managed to accommodate area wildlife.

4.11 Transportation Resources

Proposed Action

Under the Proposed Action, no direct or indirect impacts on transportation resources would be expected from leasing activities.

Short-term, direct and indirect impacts on transportation resources in the vicinity of the section 10 lease tract would be expected from mining activities associated with the Proposed Action. Potential



temporary increases in traffic volume on US-83, ND-200, County Highway 23, 4th Street NW, and 5th Street NW from trucks transporting coal from the section 10 lease tract to the Coal Creek Station would be minor. Haul roads and ancillary haul roads within the section 10 lease tract would be used and constructed to minimize any potential increases in traffic volume on roadways within the vicinity of the section 10 lease tract.

Alternative I

Under Alternative I, the 320 acres of land in the east ½ of section 10 would not be leased or mined for coal. The south ½ of section 10 is already permitted and leased for surface disturbance; therefore, surface disturbance, including the removal of topsoil and subsoil, and using the land for other ancillary mining purposes, such as stockpile (i.e. topsoil, subsoil, and overburden) locations, would occur in the southeast ¼ of section 10 (approximately 160 acres).

Short-term, direct impacts on transportation resources in the vicinity of section 10 would be expected from surface disturbance. Haul roads and ancillary haul roads within section 10 would be used and were constructed to minimize any potential increases in traffic volume on roadways within the vicinity of section 10.

4.12 Vegetation

Proposed Action

Under the Proposed Action, no direct or indirect impacts on vegetation would be expected from leasing activities.

Short-term, direct impacts on vegetation in the section 10 lease tract would be expected from mining activities associated with the Proposed Action. During mining activities, vegetation would be removed with tractor-scrapers and the truck shovel fleet (i.e., loading shovels and end-dump trucks). There are five known noxious weeds in McLean County. Disturbance of vegetation containing noxious weeds could result in the redistribution of invasive species to other areas of the Section 10 lease tract. Therefore, existing areas not dominated by noxious weeds would have the potential to become infested from mining activities. The spread of invasive species could have an adverse effect on several aspects of vegetation including the suitability of sensitive plant habitat and maintenance of native biodiversity to forage production for livestock grazing.

Upon completion of mining activities, revegetation would occur, in accordance with the guidelines outlined in the general revegetation and management plans discussed in the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. Please refer to **Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations**. Once the topsoil and subsoil are replaced, a suitable seedbed would be prepared. Areas being seeded to the temporary seed mix (i.e., ditches, embankments, and stockpiles) would be seeded as soon as possible after disturbance. For seeding native grassland, the complete mix of warm and cool season grasses would be seeded in mid-to late-June or a split seeding method would be used where the warm-season grasses would be seeded in June and the cool season grasses would be seeded in the late fall. Cropland and tame grassland would be seeded from March to the late fall. The Falkirk Mine would conduct all management and normal husbandry practices necessary (e.g., weed and pest control, litter reduction, interseeding, reseeding, fertilization, remulching) to achieve and maintain an adequate vegetation cover, which would both stabilize the soil and support the post-mining land uses and achieve revegetation goals.



Weed control would be conducted, where necessary, by using post-emergent herbicides (i.e., 2,4-D) and nonselective herbicides (i.e., Glyphosate) and by mowing. All weed control activities would be conducted in coordination with, and following the recommendations of, the local cooperative Extension Service (North Dakota Weed Control Guide) and Soil Conservation District offices in North Dakota.

Maintenance and monitoring of the revegetated areas would continue until (1) the area is consistent with the specifications outlined in the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations or (2) the area is consistent with the surrounding undisturbed vegetation and free of noxious weeds. Pre-mining vegetation surveys that were previously conducted to document the types of vegetation, cover, and production would be used as a comparison for success during monitoring. Reclamation success, for most land uses, would be generally based on an assessment of vegetation production and cover. When areas meet an “equal-to-or-better-than” production and cover standard, they may be released from bond.

Alternative I

Under Alternative I, the 320 acres of land in the east ½ of section 10 would not be leased or mined for coal. The south ½ of section 10 is already permitted and leased for surface disturbance; therefore, surface disturbance, including the removal of topsoil and subsoil, and using the land for other ancillary mining purposes, such as stockpile (i.e. topsoil, subsoil, and overburden) locations, would occur in the southeast ¼ of section 10 (approximately 160 acres).

Impacts on vegetation from surface disturbance would be similar to those described under the Proposed Action. Upon completion of surface disturbance, revegetation and vegetation management, maintenance, and monitoring conducted under Alternative I would be the same as described under the Proposed Action.

4.13 Visual Resources

Visual impacts are inherently difficult to define because of the subjectivity involved. Visual impacts deal more broadly with the extent that a proposed project contrasts with the existing environment and whether the jurisdictional agency considers this contrast objectionable. The significance of potential impacts on visual resources is based on the level of visual sensitivity in the area. Visual sensitivity is defined as the degree of public interest in a visual resource and concern over adverse changes in the quality of that resource. In general, an impact on a visual resource is adverse if implementation of a proposed project were to result in substantial alteration to an existing sensitive visual setting.

Proposed Action

Under the Proposed Action, no direct or indirect impacts on visual resources would be expected from leasing activities.

Short-term, direct and indirect impacts on visual resources in the vicinity of the section 10 lease tract might be expected from mining activities associated with the Proposed Action. Direct impacts might be expected for people using roadways in the vicinity of the section 10 lease tract including US-83, ND-200, County Highway 23, 4th Street NW, 5th Street NW, and several smaller paved and unpaved roadways. People driving on these roadways might be able to see mining activities in the section 10 lease tract the closer they got to the mining area. However, since the land in McLean County is



considered rural, with a very low population density (i.e., four people per square mile), visual impacts for people driving in the vicinity of the section 10 lease tract would likely be minor and only occur during the duration of mining activities (i.e., 4 months).

People using recreational areas at Lake Audubon, Wolf Creek, the De Trobriand State Game Management Area, and the Coal Lake Wildlife Management Area would not likely be within the viewshed of mining activities. However, people using recreational areas at Lake Sakakawea might be within the viewshed of a small portion of the section 10 lease tract, depending on where they were situated at Lake Sakakawea. However, since mining activities would only last 4 months, impacts would be indirect, minor, and temporary.

Alternative I

Under Alternative I, the 320 acres of land in the east ½ of section 10 would not be leased or mined for coal. The south ½ of section 10 is already permitted and leased for surface disturbance; therefore, surface disturbance, including the removal of topsoil and subsoil, and using the land for other ancillary mining purposes, such as stockpile (i.e. topsoil, subsoil, and overburden) locations, would occur in the southeast ¼ of section 10 (approximately 160 acres). Impacts on visual resources from surface disturbance would likely be similar to those described under the Proposed Action.

4.14 Water Resources (Groundwater, Surface Water, Wetlands, and Waters of the United States)

Evaluation criteria for impacts on water resources are based on water availability, quality, and use and associated regulations. A proposed project could have a significant effect with respect to water resources if it substantially reduced water availability or supply to existing users, caused an overdraft to groundwater basins, exceeded safe annual yield of water supply sources, substantially affected water quality, endangered public health by creating or worsening health hazard conditions, threatened or damaged unique hydrologic characteristics, or violated established laws or regulations adopted to protect water resources.

Determination of the significance of impacts on wetlands is based on (1) the loss of wetland acreage, (2) function and value of the wetland, (3) proportion of the wetland that would be affected relative to the occurrence of similar wetlands in the region, (4) sensitivity of the wetland to proposed activities, and (5) duration of the ecological ramifications. Impacts on wetland resources are considered significant if high-value wetlands would be adversely affected or if wetland acreage were lost.

Proposed Action

Groundwater

Under the Proposed Action, no direct or indirect impacts on groundwater would be expected from leasing activities.

Long-term, direct and indirect impacts on groundwater would be expected from mining activities associated with the Proposed Action. Mining activities would include the removal of the Hagel A and B lignite beds. These lignite beds are aquifers (Schobert 1995). Removal of the Hagel A and B lignite beds would disrupt these aquifers in the section 10 lease tract. Overburden removal and backfilling of mine pits would completely change the original depositional fabric of the sediments comprising the overburden. The predominantly silty clay, clayey silt, and lignite beds of the Sentinel Butte and Bullion



Creek formations were originally sorted and systematically deposited by fluvial processes in orderly layers with distinct hydraulic properties. The orderly and predictable stratigraphic sequence would be replaced in mined areas with the same materials as spoil, but in a relatively chaotic mixture.

The inflow of groundwater into mining pits makes coal removal easier and produces cones of depression in the potentiometric surfaces of aquifers present in the overburden sediments and coal adjacent to pit excavations. This drawdown of the hydraulic head would be the same as the cone of depression produced by a pumped water well. Following mining, and as its drawdown effects move away from the mined area, the potentiometric surfaces of adjacent undisturbed aquifers that were affected by mining activities would return to their pre-mining elevations. Concurrently, the regraded spoil in that area would resaturate at its base, and water level elevations in the unconfined regraded spoil would ultimately rise to approximate the hydraulic head in adjacent undisturbed hydrostratigraphic units.

Mining activities would not disturb the larger sand and gravel alluvial aquifers of Weller Slough, Coal Lake Coulee Trenches, or within the larger drainages flowing to the Missouri River. The hydraulic characteristics of these larger drainages and their alluvial saturated zones would not be affected.

The Hydrologic Reclamation Plan and Surface Water Monitoring Plan are discussed in Section 2-6 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. Please refer to ***Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations***. Groundwater hydrologic reclamation would include backfilling with spoil and regrading mined pits to provide a medium with different hydraulic properties, but similar chemical properties, to those occurring there prior to mining. This would provide for recharge and resaturation in that portion of the flow system and ultimately restore potentiometric surfaces to approximate pre-mining conditions. Topsoil and subsoil forming the near-surface unsaturated zone would be comparable in physical and chemical properties to the undisturbed material there before mining. Rapid regrading, soil respreading, and revegetation of mined areas would help to minimize excessive mineralization in the spoil water. Routine monitoring of the Falkirk Mine monitoring well network would continue post-mining to adequately define water level variations, and when necessary, wells would be periodically monitored for yield rates, water levels, and water quality.

Surface Water

Under the Proposed Action, no direct or indirect impacts on surface water would be expected from leasing activities.

Short-term, indirect impacts on surface water would be expected from mining activities associated with the Proposed Action. Removal of vegetation and excavation of soil during mining activities would result in the transport of sediment and other pollutants into nearby watersheds and water bodies during storm water flow events. Prior to any surface disturbance, the Falkirk Mine would construct a network of surface water structures (e.g., sedimentation ponds, pitwater ponds, sumps, diversions). The surface water structures would collect and treat surface runoff from disturbed areas, thereby preventing any additional contribution of suspended solids to waters downstream of the disturbed areas. The Falkirk Mine would maintain compliance with all applicable effluent standards and conditions listed in their National Pollutant Discharge Elimination (NPDES) Permit and the North Dakota PCS water management rules and regulations.



The Surface Water Management Plan in Section 3-6 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations addresses the design, construction, operation, and reclamation of the network of surface water structures. There would be two types of temporary sedimentation ponds (i.e., valley ponds and incised valley ponds) that would contain, at a minimum, the runoff resulting from a 10-year/24-hour precipitation event. Reclamation of the sedimentation ponds would be accomplished by removing the embankments and backfilling the pond sites after final dewatering, in accordance with the appropriate regulations and policies of the State Health Department and North Dakota PSC. Pitwater ponds, consisting of three cells, would be constructed to store groundwater pumped from the mining pits. Groundwater would be pumped into the two outer cells and then discharged into the center cell. Once the water in the center cell met the effluent standards outlined in the Falkirk Mine NPDES Permit, it would be discharged off of the area through a nearby natural drainage (e.g., ephemeral stream, drainage ditch). Diversion channels and road ditches would be constructed in subsoil or overburden after removal and stockpiling of the topsoil. Diversion channels and road ditches would be reclaimed by backfilling and leveling to the approximate original surface configuration.

Upon completion of mining activities, revegetation would occur, in accordance with the guidelines outlined in the general revegetation and management plans discussed in the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. This would reduce water volume and velocity of storm water runoff entering nearby surface water bodies. Please refer to **Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations**.

The Surface Water Monitoring Plan in Section 2-6 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations monitors precipitation and surface water runoff along with elevation recordings and water quality sampling at the Coal Lake and Landenberger Slough. In accordance with the Plan, total iron would be sampled annually, pH of total suspended solids would be sampled monthly in water from designated discharge points, and total water discharge and discharge rate from sedimentation ponds would be recorded. Quarterly reports summarizing water discharges would be submitted to the State Health Department and North Dakota PSC.

Wetlands and Waters of the United States

Under the Proposed Action, no direct or indirect impacts on wetlands or waters of the United States would be expected from leasing activities.

No direct or indirect impacts on waters of the United States would be expected from mining activities, as there are no waters of the United States within the section 10 lease tract. Short-term, direct impacts on wetlands would be expected from mining activities associated with the Proposed Action. Wetlands disturbed by mining would be reclaimed, as described in Section 5-2 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. Please refer to **Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations**.

Wetlands in the east ½ of the section 10 lease tract would be replaced to ensure no net loss of wetland acreage, minimize hindrance to farming, and maximize wildlife use. Post-mining temporary and seasonal wetland acreages would be at least equal to the pre-mining wetland acreages. The design of the post-mining wetland would be based on the wetland classification, pre-mining wetland acreage, watershed area, and annual runoff yield. Various wildlife enhancement practices (e.g., inclusion of



small islands, maintenance of bare shorelines, convolution of shorelines, establishment of blocks of vegetation in open water zones) would be evaluated at the time of wetland reclamation operations. Infestations of noxious weed species would likely be controlled by applications of non-selective herbicides (i.e., Glyphosphate). Monotypic stands of cattails that threaten to take over the wetland vegetation would be controlled through a combination of management practices (e.g., burning, drowning out, mowing, and root system disruption).

Alternative I

Under Alternative I, the 320 acres of land in the east ½ of section 10 would not be leased or mined for coal. The south ½ of section 10 is already permitted and leased for surface disturbance; therefore, surface disturbance, including the removal of topsoil and subsoil, and using the land for other ancillary mining purposes, such as stockpile (i.e. topsoil, subsoil, and overburden) locations, would occur in the southeast ¼ of section 10 (approximately 160 acres). No direct or indirect impacts on groundwater or waters of the United States would be expected from surface disturbance.

Short-term, indirect impacts on surface water would be expected from surface disturbance. The removal of vegetation and excavation of soil would result in the transport of sediment and other pollutants into nearby watersheds and water bodies during storm water flow events. The construction and reclamation of surface water structures for Alternative I would be the same as described under the Proposed Action. The Falkirk Mine would maintain compliance with all applicable effluent standards and conditions listed in their NPDES Permit and the North Dakota PCS water management rules and regulations. Revegetation and implementation of the Falkirk Mine Surface Water Management Plan and Surface Water Monitoring Plan for Alternative I would be the same as described under the Proposed Action. Short-term, direct impacts on wetlands would be expected from surface disturbance. The reclamation activities and replacement of wetlands for Alternative I would be the same as described under the Proposed Action.



CHAPTER 5 CUMULATIVE IMPACT ANALYSIS

Federal regulations implementing NEPA (CEQ 40 CFR § 1500–1508) require that the cumulative effects of a proposed action be assessed. CEQ regulations implementing the procedural provisions of NEPA define cumulative effects as follows (40 CFR § 1508.7):

The impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.

A cumulative effect could be additive (i.e., the net adverse cumulative effects are strengthened by the sum of individual effects), countervailing (i.e., the net adverse cumulative effect is less as a result of the interaction between beneficial and adverse individual effects), or synergistic (i.e., the net adverse cumulative effect is greater than the sum of the individual effects). Cumulative effects could result from individually minor, but collectively significant actions that take place over time. Accordingly, a cumulative effects analysis identifies and defines the scope of other actions and their interrelationship with the alternatives if there is an overlap in space and time. Cumulative effects are most likely to occur when there is an overlapping geographic location and a coincidental or sequential timing of events. Because the environmental analysis required under NEPA is forward-looking, the aggregate effect of past actions is analyzed to the extent relevant and useful in analyzing whether the reasonably foreseeable effects of a proposed action could have a continuing, additive, and significant relationship to those effects.

For the purposes of this analysis, the temporal span of the Proposed Action is considered the time during which the section 10 lease tract would be mined (i.e., 4 months). The spatial area of consideration for potential cumulative effects varies by resource area. The spatial area of consideration for some resources might only include the areas in the vicinity of the Falkirk Mine, such as for geological resources. Projects that affect the Missouri River might be important considerations for water resources or biological resources. Projects having significant air emissions within the North Dakota intrastate AQCR might be important for air quality. Therefore, given the large geographical area that could be considered for potential effects, this cumulative effects analysis focuses on the existing lignite mines that are operating near the section 10 lease tract (Falkirk Mine).

5.1 Surface Coal Mines Considered for Potential Cumulative Impacts

Historically, lignite coal mining began in North Dakota in 1873, with at least 73 mines operating by 1900. By the 1920s, there were approximately 250 mines operating in North Dakota. Western North Dakota contains an estimated 351 billion tons of lignite. North Dakota also contains an estimated 25 billion tons of economically mineable lignite, which is enough to last more than 800 years at the current annual production rate of 27.5 million tons per year. All of the economically mineable lignite occurs in the lower Fort Union Group in western and central North Dakota. Currently, there are four operating lignite mines (i.e., Beulah Mine, Center Mine, Falkirk Mine, and Freedom Mine) that produce approximately 27.5 million tons of lignite per year in North Dakota. These mines produce lignite to feed mine-mouth electricity generating plants that are located adjacent to the mines (NDGS Undated). The



four lignite mines and one mine in the development stage (i.e., Coyote Creek Mine) are located in McLean, Mercer, and Oliver counties, near the section 10 lease tract and are addressed in this cumulative effects analysis. The Coyote Creek Mine will begin operating in 2016 and will produce approximately 2.5 million tons of lignite, at which time, the Beulah Mine will reduce its annual lignite production to 0.5 million tons. **Table 14** summarizes the annual lignite produced in North Dakota in 2014.

Table 14, Summary of 2014 Lignite Production in North Dakota

SURFACE MINE ^(a)	ANNUAL PRODUCTION	PERCENT OF TOTAL ANNUAL PRODUCTION
Beulah Mine	3 million tons	10.9
Center Mine	4 million tons	14.5
Coyote Creek Mine	2.5 million tons ^(b)	9.1
Falkirk Mine	7 million tons	25.5
Freedom Mine	13.5 million tons	49.1
Total	27.5 million tons	—

Sources: NDPSC 2015, SEC 2014, NDGS Undated

Notes:

- Mines in North Dakota that produce leonardite (i.e., oxidized lignite used to treat soils and for drilling mud) are not included in this table.
- The Coyote Creek Mine is not yet in production. The Coyote Creek Mine will begin producing 2.5 million tons of lignite in 2016, at which time, the Beulah Mine will reduce its production to 0.5 million tons of lignite. Calculations for the Coyote Creek Mine in this table are estimated based on projected production.

Beulah Mine

The Beulah Mine is located east and west of North Dakota Highway-49 (ND-49), approximately 3 miles south of Beulah, in Mercer and Oliver counties. The mine was established in 1963 and expanded to its present capability in the late 1970s. As shown in Table 11, approximately 3 million tons of coal are produced per year at the Beulah Mine. In 2016, the Beulah Mine will reduce its annual production to 0.5 million tons of lignite. The owner/operator of the Beulah Mine is the Dakota Westmoreland Corporation, which is a subsidiary of Westmoreland Coal Company. The mine was formerly owned and operated by the Knife River Corporation, until it was sold to Dakota Westmoreland Corporation in 2001. Customers of the mine include the Coyote Station (operated by Otter Tail Power Company), which is located adjacent to the mine, and Heskett Station (operated by Montana-Dakota Utilities Company), which is located in Mandan, North Dakota, and receives coal by rail transport. The Beulah Mine also sells oil-treated stoker coal to smaller retail customers. The Coyote Station receives approximately 2.5 million tons of coal and the Heskett Station receives approximately 0.5 million tons of coal from the Beulah Mine (NDPSC 2015, BLM 2013). The Beulah Mine's contract with the Coyote Station expires in May 2016. The Beulah Mine is currently pursuing other contracts.

Center Mine

The Center Mine is located south of North Dakota Highway-25 (ND-25), approximately 4 miles southeast of Center, in Oliver County. The mine was established in 1970 and is owned and operated by BNI Coal, Ltd., which is a subsidiary of ALLETE (formerly Minnesota Power and Light). There are



approximately 18,000 acres that comprise the Center Mine under a mining permit and approximately 200 acres are mined and reclaimed each year. A total of approximately 4 million tons of coal are produced per year at the Center Mine. Customers of the mine include Minnkota Power Cooperative and Center Coal Company, which are both located adjacent to the Center Mine. The Center Coal Company crushes the coal it receives from the mine and resells oil treated stoker coal and lump coal to smaller retail customers (NDPSC 2015, BNI Coal 2015).

Coyote Creek Mine

The Coyote Creek Mine is located off of ND-49, approximately 6 miles southwest of Beulah, in Mercer County. The mine, to be operated by the Coyote Creek Mining Company (a subsidiary of NACC), is currently in development. The Coyote Creek Mining Company holds a sublease to 73 coal leases granting the right to mine approximately 5,777 acres of coal interests and the right to utilize approximately 13,408 acres of surface interests. In addition, the Coyote Creek Mining Company owns in fee, 160 acres of surface interests. In May 2016, the Coyote Creek Mine is expected to begin production and initiate coal delivery to the Coyote Station, which is owned by Otter Tail Power Company, Northern Municipal Power Agency, Montana-Dakota Utilities Company, and NorthWestern Corporation. Approximately 2.5 million tons of lignite is expected to be produced annually at the Coyote Creek Mine starting in 2016 (NACC 2014, SEC 2014).

Falkirk Mine

The Falkirk Mine is located west of I-83, approximately 3.5 miles south of Underwood, in McLean County. The mine was established in 1977 and is owned and operated by the Falkirk Mining Company, which is a subsidiary of the NACC. Approximately 7 million tons of coal are produced per year at the Falkirk Mine. Lignite coal is produced for the Great River Energy's Coal Creek Station, which is located adjacent to the mine (NDPSC 2015). The Falkirk Mine also supplies coal to the Spiritwood Station, located near Jamestown, North Dakota. The proposed Federal coal lease tract is located within and adjacent to the Falkirk Mine permit area.

Freedom Mine

The Freedom Mine is located north of ND-200, approximately 6 miles north of Beulah and approximately 10 miles northwest of Hazen, in Mercer County. The mine was established in 1978 and is owned and operated by the Coteau Properties Company, which is a subsidiary of the NACC. Approximately 13.5 million tons of coal are produced per year at the Freedom Mine. Customers of the mine include Dakota Gasification Company, which is located adjacent to the mine; Basin Electric Power Cooperative's Antelope Valley Power Station, which is also located adjacent to the mine; and Basin Electric Power Cooperative's Leland Olds Power Station, which is located in Stanton, and receives coal by rail transport (NDPSC 2015, DOI 2015).

An EA is currently being prepared by the U.S. Department of the Interior, OSMRE, Western Region Office for a Federal mining plan modification for the Freedom Mine's West Mine Area. On April 1, 2011, the Coteau Properties Company received Federal mining plan approval from the Assistant Secretary of Lands and Mineral Management to mine portions of the Federal coal tract NDM-91535 at the Freedom Mine. On October 28, 2014, the North Dakota PSC notified the OSMRE that they had received Permit Revision No. 18 for the Coteau Properties Company Surface Coal Mining Permit NACT-0201. The total amount of Federal coal authorized for removal within the currently approved Federal mining plan is approximately 45.1 million tons; approximately 39.1 million tons still remain to be mined. No Federal



surface acres would be added to the approved permit area; however, the Freedom Mine proposes to add approximately 960 Federal coal acres and 25.6 million tons of Federal coal to the approved Federal mining plan. The average production rate at the Freedom Mine is approximately 13.5 million tons per year and the maximum production rate is 16 million tons per year. The Permit Revision No. 18 proposed by the Freedom Mine would not change the average production rate or the maximum production rate for the life of the mining operation (i.e., until 2045). The mining plan modification would not extend the life of the mine (DOI 2015).

5.2 Cumulative Impact on Resource Areas

The following analysis examines the impact on the environment that would result from the incremental impact of the Proposed Action in addition to other past, present, and reasonably foreseeable future actions. Cumulative effects can result from individually minor, but collectively significant, actions taking place over a period of time. This analysis assesses the potential for an overlap of impacts with respect to project schedules or affected areas. This section presents a qualitative analysis of the cumulative effects, based on significant activities anticipated for the Proposed Action (e.g., ground-disturbing activities). The Proposed Action has been evaluated in conjunction with other past, present, and reasonably foreseeable future actions to determine whether cumulative effects on the human environment would occur. No significant, adverse, cumulative effects were identified in the cumulative effects analysis. The Proposed Action would have no effects on cultural resources and thus would not contribute to cumulative effects on cultural resources. Therefore, cultural resources are not included in this cumulative effects analysis.

5.2.1 Air Quality and Climate Resources

According to the Annual Report for the North Dakota Ambient Air Quality Monitoring Program completed in 2015 by the NDDH, the Coal Creek Station and coal-fired power plants in the vicinity of the section 10 lease tract are considered to be major stationary point sources (i.e., more than 100 TPY) for some of the federally listed criteria pollutants (NDDH 2015). A summary of the coal-fired power plants located in the area and considered to be major stationary point sources for CO, NO_x, VOCs, PM₁₀, and SO₂ is presented in **Table 15, Summary of Major Stationary Point Sources**.

Table 15, Summary of Major Stationary Point Sources

POLLUTANTS	GREAT RIVER ENERGY			BASIN ELECTRIC POWER COOPERATIVE		MINNKOTA POWER COOPERATIVE	OTTER TAIL POWER COMPANY	MONTANA-DAKOTA UTILITIES COMPANY
	SPIRITWOOD STATION	COAL CREEK STATION	STANTON STATION	ANTELOPE VALLEY STATION	LELAND OLDS STATION	MILTON R. YOUNG STATION	COYOTE STATION	HESKETT STATION
CO	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NO _x	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VOCs	No	Yes	No	No	Yes	Yes	No	No
PM ₁₀	No	Yes	Yes	Yes	Yes	Yes	Yes	No
SO ₂	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Source: NDDH 2015



The State of North Dakota has been classified by the EPA as in attainment for NAAQS and SAAQS. The 2015 Annual Report stated that neither the Federal nor state standards for CO (i.e., 35,000 ppb [1-hour] and 9,000 ppb [8-hour]) were exceeded. The maximum concentrations of CO were 569 ppb (1-hour) and 300 ppb (8-hour). Neither the Federal nor state standards for NO₂ (i.e., 100 ppb [1-hour] and 53 ppb [annual]) were exceeded. The maximum concentrations for NO₂ were 35 ppb (3-year average of the 98th percentile 1-hour average concentrations) and 5.52 ppb (annual). The Federal and state standards for O₃ (i.e., 75 ppb) were not exceeded. The maximum fourth highest 8-hour concentration of O₃ was 60 ppb. Neither the Federal nor state standards for PM₁₀ (i.e., 150 µg/m³ [24-hour]) or PM_{2.5} (i.e., 35 µg/m³ [24-hour] and 12 µg/m³ [annual]) were exceeded. The maximum concentration for PM₁₀ was 108.0 µg/m³, and the maximum concentrations for PM_{2.5} were 19 µg/m³ (24-hour) and 7.9 µg/m³ (annual). The Federal and state standards for SO₂ (i.e., 75 ppb [1-hour], 140 ppb [24-hour], and 30 ppb [annual]) were not exceeded. The maximum concentrations for SO₂ were 26 ppb (3-year average 1-hour 99th percentile), 6.5 ppb (24-hour), and 1.07 ppb (annual). There is no ambient air quality standard for NH₃; however, the mean 1-hour concentration reported was 4.8 ppb. There was no lead, H₂S, or hazardous air pollutant (HAP) monitoring conducted (NDDH 2015).

No cumulative effects on air quality would be expected from leasing activities associated with the Proposed Action. With respect to mining-related air quality impacts, coal processing occurring at active mines in conjunction with coal processing associated with the Proposed Action would collectively result in short-term, temporary emissions at emission rates similar to current emission rates from the Falkirk Mine. These emissions would present a temporary, minor impact on air quality in the area. As reported in the 2015 Annual Report, emissions resulting from coal processing at existing mines have not resulted in any exceedances of any Federal or state standards for criteria pollutants. Continued rates of emissions from coal processing under the Proposed Action would represent a small percentage of overall air emissions in North Dakota and are not anticipated to result in any exceedances of NAAQS or SAAQS when combined with the emissions from existing coal processing occurring at other active mines. As noted previously, the proposed leasing action, if approved, would not increase overall production levels at the mine. Therefore, cumulative effects would not be significant.

The Proposed Action in conjunction with other active mines in the vicinity of the section 10 lease tract would be expected to continue contributing to emissions of GHGs at current or lower rates from mining related activities including CH₄ emissions associated with surface mining, stationary fuel combustion associated with mine equipment operation, and post-mining reclamation activities. If the section 10 tract were leased, the mine production rate and associated overall emissions would not increase. The additional reserves in the Section 10 tract would extend mining operations by approximately four months and would provide needed coal resources for energy production at the Coal Creek and Spiritwood stations. Table 13 summarizes the estimated CO₂ emissions from coal combustion associated with the Proposed Action and coal combustion associated with other active mines. Please refer to **Table 16, Summary of Estimated CO₂ Emissions from Coal Combustion**.



Table 16, Summary of Estimated CO₂ Emissions from Coal Combustion in

SURFACE MINE ^(a)	ANNUAL PRODUCTION	ESTIMATED ANNUAL CO ₂ ^(b)	PERCENT OF UNITED STATES CO ₂ EMISSIONS ^(c)
Beulah Mine	3 million tons (2.72 million metric tons)	7.05 million metric tons	0.13
Center Mine	4 million tons (3.63 million metric tons)	9.40 million metric tons	0.17
Coyote Creek Mine	2.5 million tons ^(d) (2.27 million metric tons)	5.87 million metric tons	–
Falkirk Mine ^(e)	7 million tons (6.35 million metric tons)	16.45 million metric tons	0.30
Freedom Mine	13.5 million tons (12.25 million metric tons)	31.72 million metric tons	0.59
Total	27.5 million tons (24.95 million metric tons)	64.61 million metric tons	1.19

Sources: NDPSC 2015, SEC 2014, NDGS Undated

Notes:

- Mines in North Dakota that produce leonardite (i.e., oxidized lignite used to treat soils and for drilling mud) are not included in this table.
- The estimated annual CO₂ assumes that all of the coal mined in the coal mines would undergo complete combustion.
- The percentage of United States CO₂ emissions from coal combustion at each surface mine is approximated based on the estimated CO₂ from the annual million metric tons of coal mined. The total CO₂ emissions from each mine are compared to the United States CO₂ emissions reported in 2013 from coal combustion, which was 5,396 million metric tons (EIA 2014).
- The Coyote Creek Mine is not yet in production. The Coyote Creek Mine will begin producing 2.5 million tons of lignite in 2016, at which time, the Beulah Mine will reduce its production to 0.5 million tons of lignite. Calculations for the Coyote Creek Mine in this table are estimated based on projected production.
- The Falkirk Mine includes the section 10 lease tract.

As shown in Table 16, the total estimated CO₂ emissions from coal combustion associated with the Proposed Action and coal combustion associated with other active mines in the vicinity of the Section 10 lease tract would represent approximately 1.19 percent of the 2013 reported CO₂ emissions from coal combustion in the United States. Therefore, cumulative effects from coal combustion emissions are not anticipated to be significant for purposes of this NEPA analysis.

For purposes of this cumulative effects analysis, it is assumed that surface mining operations would release 1.91 grams of CH₄ per kilogram of surface mined coal (Spath et al. 1999). Table 14 summarizes the estimated CH₄ emissions from surface mining (excluding combustion) associated with the Proposed Action and surface mining in the vicinity of the section 10 lease tract. Please refer to **Table 17, Summary of Estimated CH₄ Emissions from Surface Mining**.



Table 17, Summary of Estimated CH₄ Emissions from Surface Mining

SURFACE MINE ^(a)	ANNUAL PRODUCTION	ESTIMATED ANNUAL CH₄	PERCENT OF UNITED STATES CH₄ EMISSIONS ^(b)
Beulah Mine	3 million tons (2,721 million kilograms)	5,198 metric tons	0.05
Center Mine	4 million tons (3,628 million kilograms)	6,931 metric tons	0.07
Coyote Creek Mine	2.5 million tons ^(c) (2,267 million kilograms)	4,332 metric tons	—
Falkirk Mine ^(d)	7 million tons (6,350 million kilograms)	12,129 metric tons	0.13
Freedom Mine	13.5 million tons (12,246 million kilograms)	23,392 metric tons	0.24
Total	27.5 million tons (24,947 million kilograms)	47,650 metric tons	0.49

Sources: NDPSC 2015, SEC 2014, NDGS Undated

Notes:

- Mines in North Dakota that produce leonardite (i.e., oxidized lignite used to treat soils and for drilling mud) are not included in this table.
- The percentage of the United States CH₄ emissions from each surface mine is approximated based on the estimated CH₄ from the annual kilograms of coal mined. The total CH₄ emissions from each mine are compared to the United States CH₄ emissions reported in 2013 from surface mining, which was 9.7 million metric tons (EPA 2015c).
- The Coyote Creek Mine is not yet in production. The Coyote Creek Mine will begin producing 2.5 million tons of lignite in 2016, at which time, the Beulah Mine will reduce its production to 0.5 million tons of lignite. Calculations for the Coyote Creek Mine in this table are estimated based on projected production.
- The Falkirk Mine includes the section 10 lease tract.

As shown in Table 17, the total estimated CH₄ emissions from surface mining at the section 10 lease tract and other active mines would represent approximately 0.49 percent of the 2013 reported CH₄ emissions from surface mining in the United States. Therefore, cumulative effects from surface mining emissions associated with total production at the Falkirk Mine in conjunction with other active surface mines in the vicinity of the proposed action are not anticipated to be significant.

On October 23, 2015, the EPA issued the final rule for the Clean Power Plan, which is expected to achieve (by calendar year 2030) a 32 percent reduction of United States power plant CO₂e emissions from 2005 levels. The plan creates a partnership between the EPA, states, tribes, and United States territories. The EPA has set emissions goals, and the states, tribes, and United States territories will choose how they will meet the goals. The EPA is currently establishing interim and final CO₂ emission performance rates for two subcategories of fossil fuel-fired electric generating units including (1) fossil fuel-fired electric steam generating units (e.g., coal- and oil-fired power plants) and (2) natural gas-fired combined cycle generating units. To maximize the range of choices available to states in implementing the standards and to utilities in meeting them, the EPA is establishing interim and final statewide goals in three forms: (1) a rate-based state goal measured in pounds per megawatt hour, (2) mass-based state goal measured in total short tons of CO₂, and (3) mass-based state goal with a new source complement measured in total short tons of CO₂. Based on this, states will develop and



implement plans that ensure that the power plants in their state (either individually, together, or in combination with other measures) achieve the interim CO₂ emissions performance rates over the period of 2022 to 2029 and the final CO₂ emissions performance rates, rate-based goals, or mass-based goals by 2030 (EPA 2015d). On February 9, 2016, the U.S. Supreme Court granted a stay on further implementation of the rule. The stay will remain in place while the Washington, D.C. Circuit resolves the merits, and until the Supreme Court resolves any appeals.

5.2.2 General Wildlife

No cumulative effects on wildlife would be expected from leasing activities associated with the Proposed Action. Implementation of mining activities associated with the Proposed Action combined with present and reasonably foreseeable future mining actions at other mine operations would result in short-term, cumulative effects on wildlife due to temporary habitat loss and fragmentation. During mining activities under the Proposed Action, the Falkirk Mine would maintain sediment-control ponds and SPGM stockpiles throughout the mining areas. These areas would be planted with a grass/forb mixture for erosion stabilization and would become dense, suitable nesting cover for waterfowl and upland species. Reclamation plans under the Proposed Action would include reclaiming tame grassland and establishing field windbreaks, which would add considerable wildlife habitat values to the cropland. In addition, all of the wetlands in the east ½ of the section 10 lease tract would be replaced to ensure no net loss of wetlands and maximize wildlife use. Therefore, cumulative effects on wildlife are not anticipated to be significant.

Noise from mining activities associated with the Proposed Action combined with noise from local vehicle traffic, agriculture equipment, and nearby mining equipment would result in short-term, cumulative effects on wildlife. Disturbance from mining activities associated with the Proposed Action combined with local vehicle traffic, agriculture equipment, and mining activities at other active mines could cause wildlife to engage in escape or avoidance behaviors. Most wildlife species in the area would be expected to quickly recover once the mining activities ceased, or habituate to the disturbances altogether. Noise from mining activities in the area could result in temporary disturbance to migratory birds; however, it is likely that migratory birds would avoid pit operation areas and use other areas not disturbed by mining activities. Under the Proposed Action, mining activities would be conducted in a manner to avoid adverse impacts on migratory birds to the extent practicable and environmental protection measures could be implemented to reduce or avoid impacts on migratory birds, as necessary. In addition, wildlife species and habitat types and subtypes would be monitored before, during, and after mining activities, and waterfowl and breeding bird surveys would be conducted under the Proposed Action. Therefore, cumulative effects on wildlife are not anticipated to be significant.

5.2.3 Geological, Mineral, and Paleontological Resources

No cumulative effects on geological, mineral, or paleontological resources would be expected from leasing activities associated with the Proposed Action. Implementation of the Proposed Action combined with present and reasonably foreseeable future mining actions at other nearby mines would result in long-term, cumulative effects on geological, mineral, and paleontological resources. Table 15 summarizes the current annual lignite production compared to the total North Dakota mineable lignite reserve base. Table 16 summarizes the mineable lignite reserves in the section 10 lease tract compared to the total North Dakota mineable lignite reserve base.



Please refer to **Table 18, Annual Lignite Production Compared to the Total North Dakota Mineable Lignite Reserve Base** and **Table 19, Lease Tract Mineable Lignite Reserves Compared to the Total North Dakota Mineable Lignite Reserve Base**.

Table 18, Annual Lignite Production Compared to the Total North Dakota Mineable Lignite Reserve Base

SURFACE MINE ^(a)	ANNUAL PRODUCTION	PERCENT OF TOTAL ANNUAL PRODUCTION	PERCENT OF RESERVE BASE ^(b)
Beulah Mine	3 million tons	10.9	0.012
Center Mine	4 million tons	14.5	0.016
Coyote Creek Mine	2.5 million tons ^(c)	9.1	–
Falkirk Mine ^(d)	7 million tons	25.5	0.028
Freedom Mine	13.5 million tons	49.1	0.054
Total	27.5 million tons	–	0.11

Sources: NDPSC 2015, SEC 2014, NDGS Undated

Notes:

- Mines in North Dakota that produce leonardite (i.e., oxidized lignite used to treat soils and for drilling mud) are not included in this table.
- The total North Dakota mineable lignite reserve base is approximately 25 billion tons.
- The Coyote Creek Mine is not yet in production. The Coyote Creek Mine will begin producing 2.5 million tons of lignite in 2016, at which time, the Beulah Mine will reduce its production to 0.5 million tons of lignite. Calculations for the Coyote Creek Mine in this table are estimated based on projected production.
- The Falkirk Mine includes the section 10 lease tract.

Table 19, Lease Tract Mineable Lignite Reserves Compared to the Total North Dakota Mineable Lignite Reserve Base

LEASE TRACT	MINEABLE RESERVES	PERCENT OF TOTAL ANNUAL PRODUCTION	PERCENT OF RESERVE BASE*
Section 10	3.39 million tons	12.3	0.014

Note: * The total North Dakota mineable lignite reserve base is approximately 25 billion tons.

The 7 million tons of lignite produced annually at the Falkirk Mine represents approximately 0.028 percent of the total North Dakota mineable lignite reserve base and constitutes approximately 25.5 percent of the total annual lignite production in North Dakota. The 3.39 million tons of coal contained in the section 10 lease tract represents approximately 0.014 percent of the total North Dakota mineable lignite reserve base and constitutes approximately 12.3 percent of the current total annual lignite production at other active mines. Therefore, cumulative effects on mineral resources are not anticipated to be significant.

Cumulative effects on topography from ground disturbing activities (e.g., top soil, sub soil, overburden, interburden, and coal removal) associated with the Proposed Action, when combined with the ground disturbing activities associated with all of the existing North Dakota lignite mines, would be minor. Except for the removal of the coal beds, the overall nature of the geological and mineral resources of



the area are not anticipated to change. It is likely that there are continuous (unconventional) gas resources in the mining areas associated with the Proposed Action; therefore, implementation of the Proposed Action could contribute to the overall loss of continuous gas resources in the area. It is unlikely that there are oil resources in the mining areas associated with the Proposed Action; therefore, implementation of the Proposed Action is not anticipated to contribute to the overall loss of oil resources in the area.

Mining-related subsidence impacts occurring at other active mines in conjunction with subsidence impacts associated with the Proposed Action would collectively result in short-term, temporary, cumulative effects. The surface effects of subsidence associated with the Proposed Action would depend on the characteristics of the overburden, depth of mining, and thickness of the coal bed(s) removed. The overall effects from subsidence from mining associated with Proposed Action and mining at the Falkirk Mine are anticipated to be minor over the short-term and negligible over the long-term. All areas reclaimed under the Proposed Action would conform and be consistent with the adjacent topography of unmined land. Any highwalls remaining from the final cut would be graded to comply with existing applicable state and Federal regulations. Upon completion of final grading, surface drainage patterns would be reestablished to approximate the general basins that existed prior to mining.

Cumulative effects on paleontological resources from mining activities associated with the Proposed Action, when combined with the mining activities of all North Dakota lignite mines, would be minor depending on the paleontological resources contained in each of the coal mines. It is likely that there are paleontological resources in the Sentinel Butte and Coleharbor formations associated with the Proposed Action; therefore, implementation of the Proposed Action could contribute to the overall loss of paleontological resources of scientific interest (e.g., flora, clam, insect, fish, bird, amphibian, and mammal fossils) in the area. Under the Proposed Action, potential impacts on paleontological resources would be assessed by a professional permitted paleontologist in accordance with best management practices. The results of the assessment would be the basis for development of a mitigation plan and recommendation for proceeding with the mining.

5.2.4 Hazardous and Solid Waste

No cumulative effects would be expected from leasing activities associated with the Proposed Action. No hazardous materials would be used, and there would be no generation of hazardous or solid wastes associated with the leasing activities.

Mining activities associated with the Proposed Action would not include the use of hazardous materials or generation of hazardous wastes. However, mining activities would generate non-coal wastes (e.g., trees, brush, wood materials, brick) and municipal solid waste (e.g., food scraps, paper, product packaging). Disposal of non-coal wastes associated with the Proposed Action would occur in approved mining pits surrounded by land owned by the Falkirk Mine, and therefore, would not affect the capacities of the non-coal waste disposal areas at other active mines. The quantity of municipal solid waste generated from mining activities associated with the Proposed Action, when added to the municipal solid waste generated at other active mines, is not anticipated to exceed the capacities of municipal solid waste disposal facilities in the area.

5.2.5 Noise

No cumulative effects on the noise environment would be expected from leasing activities associated with the Proposed Action. Noise from mining activities associated with the Proposed Action combined with noise from local vehicle traffic, agriculture equipment, and nearby mining equipment would result in short-term, cumulative effects on the noise environment. Overall, mining activities associated with the Proposed Action would collectively increase noise levels in the area temporarily, but variations in the timing of cumulative mining activities would moderate impacts over space and time. Equipment noise from other active mines and agricultural activities combined with equipment noise from mining activities associated with the Proposed Action would be noticeable but consistent with ongoing activities near the section 10 lease tract. Therefore, increased noise from the Proposed Action would not be expected to result in significant, cumulative effects on the noise environment in the area.

5.2.6 Prime and Unique Farmland

No cumulative effects on prime or unique farmland or farmland of statewide importance would be expected from leasing activities associated with the Proposed Action.

Cumulative effects on farmland of statewide importance from mining activities associated with the Proposed Action, when combined with the mining activities occurring at other active mines, would be minor depending on the amount of prime and unique farmlands and farmland of statewide importance in each of the coal mines. Reclamation conducted at all surface mines in North Dakota includes a two-lift method: (1) topsoil composed of the A horizon and the upper B horizon and (2) subsoil composed of the lower B and C horizons. This two-lift method has been shown effective in reclaiming croplands to their full premining yield potential. The Falkirk Mine would be required to prepare a Form AD-1006, Farmland Conversion Impact Rating, and would need to avoid, minimize, or mitigate for the conversion of the farmland of statewide importance if the NRCS determined the Proposed Action would impact farmland of statewide importance. In addition, the Falkirk Mine would conduct reclamation activities that would create a final soil that would have a productive capacity equal to, or greater than, that which existed prior to mining.

5.2.7 Socioeconomics and Environmental Justice

Private ownership of the mineral estate for the areas to be mined in the section 10 lease tract and existing mining operations would receive lease bonus payments and production royalty payments for leasing and mining their coal interest. This would increase their incomes and temporarily stimulate the economy and increase business volume in the area during the lease terms. The leasing activities associated with the Proposed Action, when combined with leasing activities occurring at other active mines, would not result in substantial changes to the current economic conditions of the region, displace substantial numbers of people, substantially reduce the number of available housing units, cause a substantial decrease in property values, disproportionately affect minority or low-income populations, or cause any environmental health and safety risks that would disproportionately affect populations of children.

Mining activities associated with the Proposed Action in conjunction with mining activities occurring at other active mines would result in increases in employment and business volume in the area during the time in which mining would occur due to increases in payroll taxes, sales receipts, and the indirect purchase of goods and services. Mining activities in the section 10 lease tract are expected to provide



four months-worth of production. The mining activities associated with the Proposed Action, when combined with mining activities occurring at other active mines, would not result in substantial changes to the current economic conditions of the region, displace substantial numbers of people, reduce the number of available housing units, or cause a substantial decrease in property values.

McLean, Mercer, and Oliver counties contain lower minority populations and lower percentages of individuals living below the poverty level in comparison to the State of North Dakota. Therefore, no minority or low-income populations would be cumulatively or disproportionately affected by mining activities associated with the Proposed Action. In addition, there are no environmental health and safety risks identified that would disproportionately affect populations of children, as the areas to be mined would be fenced and appropriately marked with signs to prevent trespassing.

5.2.8 Soils

No cumulative effects on soils would be expected from leasing activities associated with the Proposed Action. With respect to mining-related soil impacts, surface mining at other active mines in conjunction with surface mining associated with the Proposed Action would collectively result in short-term, cumulative effects.

In general, mining activities in the area impact soils by changing their structure, organic content, fertility, infiltration, and permeability. Reclamation of surface mines minimizes erosion and sedimentation once mining activities have ceased. During mining activities associated with the Proposed Action, SPGM would either be stockpiled in the areas designated for topsoil and subsoil stockpiles or directly respreads onto approved regraded areas to minimize erosion and sedimentation. Under the Proposed Action, reclamation activities would include scarifying overburden prior to subsoil replacement, resspreading topsoil and subsoil material on approved areas, and mulching and seeding the area. In addition, the Falkirk Mine would submit an SPGM removal plan prior to each SPGM removal season to the North Dakota PSC. The plan would address the volume of SPGM projected to be salvaged during the season and would include a map depicting the SPGM removal operations. Therefore, cumulative effects on soils from potential increases in erosion and sedimentation from mining activities would not occur.

5.2.9 Threatened, Endangered, Proposed, and Candidate Species

No cumulative effects on threatened or endangered species would be expected from leasing activities associated with the Proposed Action. Mining activities associated with the Proposed Action combined with mining activities occurring at other active mines could result in short-term, cumulative effects on populations of whooping cranes in the area depending on the amount and availability of habitat in nearby coal mines.

Under the Proposed Action, temporary habitat loss and fragmentation and increased noise would be expected from mining activities, which could temporarily displace populations of whooping cranes. However, most of the species in the area would be expected to quickly recover from noise disturbances once mining activities ceased, or habituate to the disturbances altogether. In addition, reclamation plans under the Proposed Action would include reclaiming tame grassland and establishing field windbreaks, which would add considerable wildlife habitat values to the cropland, and all of the wetlands in the east ½ of the section 10 lease tract would be replaced to ensure no net loss of wetlands and maximize wildlife use. As part of the Proposed Action, wildlife species and habitat types and



subtypes would be monitored before, during, and after mining activities, and waterfowl and breeding bird surveys would also be conducted. Therefore, cumulative effects are not anticipated to be significant.

5.2.10 Transportation Resources

No cumulative effects on transportation would be expected from leasing activities associated with the Proposed Action. Short-term, cumulative effects on transportation could be expected from mining activities associated with the Proposed Action. Potential temporary increases in traffic volume on ND-200 from trucks transporting coal from the section 10 lease tract to the Coal Creek Station would be minor. Haul roads and ancillary haul roads within the coal mining areas would be used and were constructed to minimize any potential increases in traffic volume on local roadways.

5.2.11 Vegetation

No cumulative effects on vegetation would be expected from leasing activities associated with the Proposed Action. Mining activities associated with the Proposed Action combined with mining activities occurring at other active mines would result in short-term, cumulative effects on vegetation.

During mining activities associated with the Proposed Action, vegetation would be removed; however, upon completion of mining activities revegetation would occur. The Falkirk Mine would conduct all management and normal husbandry practices necessary (e.g., weed and pest control, litter reduction, interseeding, reseeding, fertilization, remulching) to achieve and maintain an adequate vegetation cover, which would both stabilize the soil and support the post-mining land uses and achieve revegetation goals. In addition, the Falkirk Mine would conduct maintenance and monitoring of the revegetated areas until (1) the area is consistent with the specifications outlined in the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations or (2) the area is consistent with the surrounding undisturbed vegetation and free of noxious weeds. Therefore, the Proposed Action would not contribute to an overall long-term, cumulative loss of vegetation in the area.

5.2.12 Visual Resources

No cumulative effects on visual resources would be expected from leasing activities associated with the Proposed Action. Mining activities associated with the Proposed Action combined with mining activities occurring at other active mines could result in short-term, cumulative effects on visual resources.

The overall area of McLean, Mercer, and Oliver counties is primarily rural (Mercer County is 35 percent urban). The population densities in McLean, Mercer, and Oliver counties range from very low to low (3 to 8 people per square mile). People using ND-200 in the vicinity of the section 10 lease tract and Freedom Mine would likely be able to see mining activities the closer they got to the mining area. However, since the land in McLean and Mercer counties is considered primarily rural, with very low to low population densities, cumulative visual impacts for people driving on ND-200 in the vicinity of the mining areas would be minor and only occur during the duration of the mining activities. People using recreational areas at the Coal Lake Wildlife Management area would not likely be within the viewshed of mining activities associated with the Proposed Action. Since no other active coal mines are within the viewshed (i.e., approximately 3 miles) of the Coal Lake Wildlife Management area, cumulative effects would not be expected.



5.2.13 Water Resources (Groundwater, Surface Water, Wetlands, and Waters of the United States)

No cumulative effects on groundwater, surface water, or wetlands would be expected from leasing activities associated with the Proposed Action. No cumulative effects on waters of the United States would be expected from leasing or mining activities associated with the Proposed Action, as there are no waters of the United States within the section 10 lease tract. Mining activities associated with the Proposed Action combined with mining activities occurring at other active mines would result in long-term, cumulative effects on groundwater and short-term, cumulative effects on surface water and wetlands.

Most of the recoverable lignite in North Dakota occurs in the Sentinel Butte and Bullion Creek formations of the Fort Union Group. The lignite beds in the Fort Union Group frequently serve as aquifers. Mining activities associated with the Proposed Action would include the removal of the Hagel A and Hagel B lignite beds. Mining activities occurring at active mines located in Mercer and Oliver counties include the removal of the Hagel, Beulah Zap, Twin Buttes, Schoolhouse, and Kinneman Creek beds (Schobert 1995).

The predominantly silty clay, clayey silt, and lignite beds comprising the Sentinel Butte Formation were originally sorted and systematically deposited by fluvial processes in orderly layers with distinct hydraulic properties. Upon backfilling the mined out pits during early reclamation activities, the orderly and predictable stratigraphic sequence would be replaced in these areas, but in a relatively chaotic mixture. Groundwater hydraulic reclamation associated with the Proposed Action would include backfilling with spoil and regrading the pits to provide a medium with different hydraulic properties, but similar chemical properties, to those occurring there prior to mining. This would provide for recharge and resaturation in that portion of the flow system and ultimately restore potentiometric surfaces to approximate pre-mining conditions. Therefore, long-term, cumulative effects on groundwater in the Sentinel Butte and Bullion Creek formations would not be considered significant.

Mining activities associated with the Proposed Action would include vegetation removal and soil excavation, which would add to the overall transport of sediment and other pollutants in the area to nearby watersheds and water bodies during storm water flow events. The Falkirk Mine would construct surface water structures prior to surface disturbance and maintain compliance with all applicable effluent standards and conditions listed in their NPDES permit and North Dakota PCS water management rules and regulations. Upon completion of mining activities, the Falkirk Mine would revegetate mined areas, which would reduce water volume and velocity of storm water runoff entering nearby water bodies. Therefore, short-term, cumulative effects from sediment and pollutant transport from mining activities in the area would not be significant.

Mining activities in the section 10 lease tract combined with mining activities occurring at other active coal mines would collectively result in minor, cumulative effects on wetlands in the area, depending on the amount of wetland acreage disturbed at each coal mine. Wetlands in the section 10 lease tract disturbed by mining activities would be replaced to ensure no net loss of wetland acreage, minimize hindrance to farming, and maximize wildlife use. Post-mining temporary and seasonal wetland acreages would be at least equal to the pre-mining wetland acreages. Therefore, cumulative effects from wetland disturbance would be temporary.



In 2011, the North Dakota PSC completed a Cumulative Hydrologic Impact Assessment (CHIA) of the Falkirk Mining Company that included an assessment of the probable cumulative hydrologic impacts of all of the anticipated mining in the area of the Falkirk Mine, as required by NDCC 38-14.1-21-(3)(c) (NDPSC 2011). The following paragraphs provide summaries of the probable cumulative hydrologic impacts on groundwater, surface water, and wetlands, as discussed in the CHIA.

All groundwater wells within the assessment area that have been, or would be, destroyed by mining or affected by temporary head loss during mining are listed and discussed in Section 2.2.5 of the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. The probable hydrologic consequences assessment of the Falkirk mining permits indicate that several operating wells within the permit boundaries of the coalfield have been, or would be, destroyed by mining. In all instances, suitable replacement sources have been identified in the permit narrative and include deeper aquifers, as well as piped rural water that would provide similar or better water quality and quantity than what was available prior to mining. Several other wells in the general area have experienced, or may experience, drawdown effects from mining activities. If any adverse impacts were to occur, the Falkirk Mine would be required by regulations to replace lost supplies with water of equal or better quantity and quality at no significant increase in operating or maintenance costs to the owner. Adequate replacement sources exist and are discussed in the permit (NDPSC 2011). Please refer to **Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations**.

According to the CHIA, seasonal low water levels of the Sayers, Weller, Samuelson, and slough systems are probably augmented by mine production of groundwater. However, during the dry conditions of 1988-1992, water levels of these slough systems were not significantly altered by the mine contribution. During wet periods, the natural and mine-discharged groundwater contribution to Coal Lake can be a factor in wetland habitat suitability, and the Falkirk Mine works with the USFWS to maintain optimal water levels in the lake. Evapotranspiration typically exceeds precipitation in North Dakota, and the magnitude of evaporative losses in the mine surface water management system and in the surrounding wetlands has not been determined. The dewatering of shallow aquifers at active pits is likely balanced somewhat by increased natural recharge of glacial aquifers within the wetlands drainage systems, which receive mine NDPDES discharges. The Falkirk Mine operations maintain cleaner surface water discharges than are typical for McLean County. Positive dilution effects on surface water quality downstream from permit areas are insignificant because the quantities discharged through the mine NDPDES system, though large, are relatively small compared to the volumes of water contributed by natural groundwater discharge systems and surface runoff outside permitted areas.

Potential effects on wetlands in the permit area and adjacent areas are addressed, and plans for wetland replacement are detailed, in the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. Impacts on springs, wells, or stock dams are not anticipated, other than those in or adjacent to the permit area, as discussed in the Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations. Please refer to **Appendix B, Falkirk Mine Permit to Engage in Surface Coal Mining and Reclamation Operations**.



5.3 Relationship between Short-Term Uses of the Human Environment and Maintenance and Enhancement of Long-Term Productivity

NEPA requires consideration of the relationship between short-term use of the environment and the impacts that such use could have on the maintenance and enhancement of long-term productivity of the affected environment. Impacts that narrow the range of beneficial uses of the environment are of particular concern. Such impacts include the possibility that choosing one alternative could reduce future flexibility to pursue other alternatives, or that choosing a certain use could eliminate the possibility of other uses at the site. Short-term uses of the biophysical components of the human environment include direct impacts, usually related to construction activities, which occur over a period of less than 5 years. Long-term uses of the human environment include those impacts that occur over a period of more than 5 years, including permanent resource loss. Since mining activities in the section 10 lease tract would occur for 4 months, the Proposed Action would be expected to result in minor, cumulative effects; however, these cumulative effects would not be considered significant.

5.4 Irreversible and Irretrievable Commitment of Resources

NEPA (42 U.S.C. 4332 Section 102(2)(C)(v) as implemented by CEQ regulation 40 CFR 1502.16) requires an analysis of significant, irreversible effects resulting from implementation of a proposed action. An irreversible or irretrievable commitment of resources refers to impacts on or losses to resources that cannot be reversed or recovered, even after an activity has ended. Resources that are irreversibly or irretrievably committed to a project are those that are typically used on a long-term or permanent basis; however, those used on a short-term basis that cannot be recovered (e.g., non-renewable resources such as metal, wood, fuel, paper, and other natural resources) also are considered irretrievable. Human labor is also considered an irretrievable resource. All such resources are irretrievable in that they are used for a project and thus, become unavailable for other purposes.

An impact that falls under the category of the irreversible or irretrievable commitment of resources is the destruction of natural resources that could limit the range of potential uses of that resource. Implementation of the Proposed Action would result in an irreversible commitment of vehicles and equipment used during mining activities and human labor and other resources. Energy, water, fuel consumption, and demand for services would not increase significantly as a result of implementation of the Proposed Action. Operation at the Great River Energy's Coal Creek Station would use energy resources by burning lignite coal. Overall, the consumption of energy resources would not place a significant demand on their availability in the region. The commitment of these resources is undertaken in a regular and authorized manner and does not represent a significant impact.



CHAPTER 6 CONSULTATION AND COORDINATION

6.1 Consultation and Coordination

Project specific consultation and coordination occurred at an initial project kickoff meeting held on March 23, 2015, at the Falkirk Mine. Agencies that attended the meeting included BLM; OSMRE; North Dakota PSC; and representatives from the Falkirk Mine, NACC, and KLJ. Discussions at the kickoff meeting included the areas of concern on the proposed project and necessary clearance and approvals received during preparation of the existing mine permits. In addition, BLM conducted internal scoping with pertinent agencies to determine resources potentially affected.

A letter detailing the proposed project, map of the project location, and Class I cultural resources packet was submitted to the THPO of the MHAN, LSIC, FPT, NCT, SLST, SRST, and TMBC. In addition, the Class III Cultural Resources Inventory conducted in 2015 was also submitted to the THPO of those Tribes. To date, the BLM has not received any comments or concerns regarding the proposed project or Class III pedestrian cultural resources inventory from any of the aforementioned Tribes.

Coordination with the North Dakota SHPO was conducted for the proposed project. On June 29, 2015, a concurrence letter from the North Dakota SHPO was received that provided a finding of “no historic properties affected” for the section 10 lease tract, provided the project proceeds as currently planned.

6.2 Preparers and Contributors

AFFILIATION	NAME	TITLE	PROJECT ROLE
Bureau of Land Management	Anne Allen	Mining Engineer	Review of EA
	Susan Bassett	Air Resource Specialist	Review of EA
	Kathleen Bockness	Planning and Environmental Coordinator	Review of EA
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	Kevin Holmes	Supervisory Natural Resources Specialist	Review of EA
	Seth Jackson	Realty Specialist	Review of EA
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	Jessica M. Montag	Socioeconomic Specialist	Review of EA
	Amelia Pennington	Natural Resource Specialist	Project Manager, internal scoping, review of EA
	Phillip Perlewitz		Review of EA
	Justin W. Peters	Archaeologist	Review of EA, THPO and SHPO consultations
	Russ Pigors	Physical Scientist	Review of EA
	Thomas Probert	Hydrologist	Review of EA
	Christopher Robinson	Hydrologist	Review of EA
	Dorothy Van Oss	Geologist	Project Manager, review of EA



AFFILIATION	NAME	TITLE	PROJECT ROLE
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Office of Surface Mining Reclamation and Enforcement	Marcelo Calle	Field Operations Branch Manager	Cooperator, review of EA
	Robert Postle	Program Support Division Manager	Cooperator, review of EA
North Dakota Public Service Commission	Jim Deutsch	Director, Reclamation/AML	Cooperator, review of EA
The Falkirk Mining Company	Jeremy Eckroth	Environmental Specialist	Review of EA
KLJ	Emily Geraldts	Environmental Planner	EA author
	Duane Klinner	Archaeologist	Cultural Resources Surveys
	Jeff Moss	Environmental Planner	EA author
	Elizabeth Ricciardi	Environmental Planner	EA author
	Ashley Ross	Environmental Planner	Project Manager, EA author



CHAPTER 7 REFERENCES, ABBREVIATIONS, AND ACRONYMS

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ABBREVIATIONS AND ACRONYMS

µg/m ³	micrograms per cubic meter	IPCC	Intergovernmental Panel on Climate Change
AAQM	Ambient Air Quality Monitoring	LSIC	Lower Sioux Indian Community
ACS	American Community Survey	MBTA	Migratory Bird Treaty Act
ASLM	Assistant Secretary for Land and Minerals Management	mg/m ³	milligrams per cubic meter
BLM	Bureau of Land Management	MHAN	Mandan, Hidatsa, and Arikara Nation
CAA	Clean Air Act	MLA	Mineral Leasing Act
CEQ	Council on Environmental Quality	mph	miles per hour
CFR	Code of Federal Regulations	MW	megawatts
CH ₄	methane	N ₂ O	nitrous oxide
CHIA	Cumulative Hydrologic Impact Assessment	NAAQS	National Ambient Air Quality Standards
CO	carbon monoxide	NACC	North American Coal Corporation
CO ₂	carbon dioxide	NCT	Northern Cheyenne Tribe
CO ₂ e	carbon dioxide equivalent	NDDH	North Dakota Department of Health
CWA	Clean Water Act	NDFO	North Dakota Field Office
dBA	A-weighted decibels	NEPA	National Environmental Policy Act
EA	Environmental Assessment	NH ₃	ammonia
EIS	Environmental Impact Statement	NHPA	National Historic Preservation Act
EO	Executive Order	NO ₂	nitrogen dioxide
EPAct	Energy Policy Act	NO _x	nitrogen oxides
ESA	Endangered Species Act	NO _y	total reactive oxides
FPPA	Farmland Protection Policy Act	NRCS	Natural Resources Conservation Service
FPT	Fort Peck Tribes	NRHP	National Register of Historic Places
FR	Federal Register	O ₃	ozone
ft ³	cubic feet	OSHA	Occupational Safety and Health Administration
GHG	greenhouse gas	OSMRE	Office of Surface Mining Reclamation and Enforcement
GPS	Global Positioning System	Pb	lead
GWP	Global Warming Potential	PFYC	Potential Fossil Yield Classification
H ₂ S	hydrogen sulfide	PM _{2.5}	particulate matter equal to or less than 2.5 microns in diameter
HAP	hazardous air pollutant		



PM ₁₀	particulate matter equal to or less than 10 microns in diameter	SO ₂	sulfur dioxide
ppb	parts per billion	SPGM	suitable plant growth material
ppm	parts per million	SRST	Standing Rock Sioux Tribe
PSC	Public Service Commission	THPO	Tribal Historic Preservation Officer
PSD	Prevention of Significant Deterioration	TMBC	Turtle Mountain Band of Chippewa
R2P2	Resource Recovery and Protection Plan	TPY	tons per year
RMP	Resource Management Plan	USACE	U.S. Army Corps of Engineers
SAAQS	State Ambient Air Quality Standards	U.S.C.	United States Code
SDWA	Safe Drinking Water Act	USDA	U.S. Department of Agriculture
SHPO	State Historical Preservation Office	EPA	U.S. Environmental Protection Agency
SHSND	State Historical Society of North Dakota	USFWS	U.S. Fish and Wildlife Service
SIP	State Implementation Plan	USGS	U.S. Geological Survey
SLST	Spirit Lake Sioux	VOC	volatile organic compound
SMCRA	Surface Mining Control and Reclamation Act		





Appendix A

Falkirk Mine Plan



Appendix B

*Falkirk Mine Permit to Engage in Surface Coal Mining
and Reclamation Operations*